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COMMERCIAL FISHERIES REVIEW



A review of developments and news of the fishery industries
prepared in the BUREAU OF COMMERCIAL FISHERIES.

Joseph Pileggi, Editor
H. M. Bearse, Assistant Editor

Address correspondence and requests to the: Chief, Branch of Market News, Bureau of Commercial Fisheries, U. S. Department of the Interior, Washington 25, D. C.

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AIR-CURTAIN FISHING FOR MAINE SARDINES

By Keith A. Smith*

SUMMARY

Since its initiation, nearly a century ago, the Maine sardine industry has been dependent upon passive types of gear--weirs and stop seines--for the capture of its basic raw material, the Atlantic herring (*Clupea harengus harengus*). Such gear, although effective in capturing inshore schools and in incorporating the necessary provision for holding the live fish for several days, is not effective in coping with the schools when, as often happens, they remain in deeper water offshore. Failure of the herring to move inshore has often resulted in cannery supply shortages.

Realizing the need for a more active and far-reaching type of gear, the U. S. Bureau of Commercial Fisheries began, in 1955, to experiment with other types of gear. Research activities were largely based on the premise that, since the herring are easily-frightened fish, a device that would frighten them might also be used to drive or guide the fish from deep water to the areas where they could be taken in the weirs and stop seines. In the past three years, the usefulness and effectiveness of an air-bubble curtain for driving and guiding the herring has been demonstrated to the industry, and at least 12 air-curtain units have now been constructed by members of the Maine industry.

Essentially, the air-bubble curtain consists of several lengths of $\frac{1}{2}$ - to $\frac{3}{4}$ -inch-diameter polyethylene pipe, weighted to lie on or near the sea bottom, and from which columns of bubbles escape through $\frac{1}{8}$ -inch holes bored in the pipes at regular intervals. Air is supplied by a shipboard compressor. The bubble curtain is used to surround the fish and slowly draw them to the seines, or to otherwise direct them in the direction of the weirs and seines by cutting across their normal path of movement.

BACKGROUND

The Maine sardine industry began in the 1870's when the Franco-Prussian War restricted the supply of Russian and French sardines to the United States. New York importers searched for a supply of sardines to be packed in the style known as Russian sardines, which were described by Goode (1887) as "small herring packed in spices and vinegar." The importers became interested in the large schools of Atlantic herring (*Clupea harengus harengus*) that occurred each summer in the vicinity of Eastport and Lubec, Maine, i.e., the Passamaquoddy and lower Bay of Fundy area, and after initial experiments, they concluded that the fish could be properly processed and canned as Russina sardines.

In 1875, 200 to 300 cases of the fish were packed in Eastport, and during the next few years there was a rapid expansion of the industry. By 1880, nineteen canneries were in op-

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eration and packed \$800,000 worth of sardines, including Russian sardines, anchovies, and sardines in oil, mustard, spices, and tomato sauce (Earl 1887). By 1886, the number of canneries had increased to 45--the approximate number processing sardines in recent years.

The conventional methods of catching sardine-size herring--stop-seining and weir-fishing--are restrictive and confine fishing operations to very shallow waters. Limitations of these methods, combined with natural fluctuations in abundance, often cause shortages in the herring supply, and result in cannery shutdowns and associated instabilities in the sardine industry. Fishing-gear research by the U. S. Bureau of Commercial Fisheries has been directed toward increasing the range and effectiveness of Maine sardine fishing gear to diminish the effect of supply shortages.

FISHING METHODS

Stake-and-brush fish weirs or traps were originally used for catching the small herring. The earliest were probably copies of Indian traps used in the Passamaquoddy Bay area.

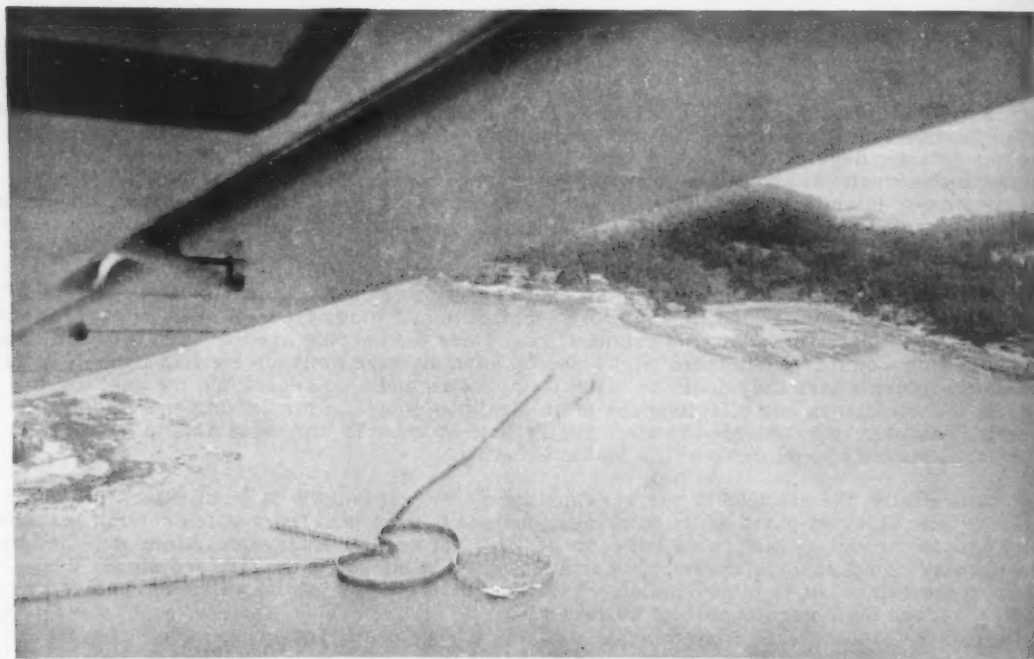


Fig. 1 - Typical weir and holding pocket or "parlor" used for catching Maine sardines.

Weirs of similar design are used to this day, although the modern weirs are constructed of much longer stakes or pilings that are driven into the mud with cotton or nylon nets stretched and fastened over them. Seines were tried early in the fishery also; but this method became extremely unpopular among weir operators, and laws were passed in the 1800's to prohibit seining. These laws have since been repealed and a "drag seine" or "stop seine" is the dominant type of gear now used for catching Maine sardines. The stop seine is a straight piece of netting of approximately 1-inch mesh size (stretched measure) made up in sections 100 fathoms long and 7 to 10 fathoms deep. One to ten 100-fathom lengths of this gear are used to "shut-off" the mouth of a cove or small bay after the herring schools have migrated into the cove. A set of 200 to 500 fathoms is the most common.

Stop-seine gear is very efficient in that it catches 100 percent of the herring available when schools can be located inside suitable coves or on shallow beaches. Over 60 percent of the 1947 catch was taken with stop-seine gear (Scattergood 1949), and at the present time approximately 84 percent of the Maine herring catch is being taken in stop seines (Power 1958).

As effective as sardine-weir and stop-seine methods are for catching the small herring, they have a common and serious deficiency. Both methods are passive and are completely dependent upon migrations of herring to the shallow-water fishing sites. During late spring, summer, and fall, schools of herring usually migrate from the deeper waters of the open ocean and the bays up into the smaller coves on what is generally believed to be a feeding migration. It is during these movements that the opportunity for catching the herring is presented. Often, however, herring schools fail to run inshore far enough to be caught with stop seines or weirs. They can frequently be located (even when fishermen inshore are actively seeking fish and sardine processors are standing by in their idle plants) lying in the deeper waters of the larger bays and inlets along the coast, where they remain sometimes for periods of weeks, but fail to make the anticipated migrations up into the shallow waters. A situation of apparent scarcity often exists, therefore, when in actuality plenty of herring are to be found along the Maine coast.

Stop seines and weirs, despite their shortcomings, have remained the sole gear used for taking herring for sardine processing because they perform an essential function that other types of gear cannot; they hold herring alive for periods of up to one month without serious loss of quality or total weight. The fish must be held alive for two reasons:

- (1) to allow their intestines to clear of food and fecal matter; and
- (2) to provide live storage of the fish until it is possible for the canneries' carrier vessels to pick them up for processing.

Since the sardines are packed whole except for removal of the head and gills, it is essential, in the interest of producing a palatable product, that the live fish be held for a period of from several hours to several days to completely clear the intestines of the fish.



Fig. 2 - Set of Maine sardine stop-seine gear. The fishermen are attaching a holding pocket into which the small herring will be allowed to swim at the next low tide. This is accomplished by sinking the floatline of the stop seine where it adjoins the pocket.

Thus the present conventional fishing methods provide the essential feature of holding the fish alive for as long as is necessary and convenient, but they impose rather drastic restrictions on the areas in which fishing operations can be prosecuted. Owing to a high tidal range (which averages over 18 feet between high and low tides at Eastport, Maine) and consequent rapid tidal currents, stop-seine fishing is limited to depths of approximately 36 feet at low tide. Weir fishing operations are likewise restricted to shallow-water areas, as it is

impractical to drive weir stakes in water depths of much over 30 feet at high tide. The herring fisherman, whether he is a weir operator or a seiner, is, therefore, in the position of waiting for the herring to come to him rather than being able to go out and seek the schools of fish wherever they may occur.

GEAR EXPERIMENTS

The Bureau's Maine Herring Exploration and Gear Research Project was set up in 1955. Part of its directive was to study the sardine fishing gear to see if improvements were possible. It was recognized that a more active and aggressive method of catching the young herring was needed. There was a need to extend the sardine gear from the very restricted, shallow-water, inside locations to at least the deeper water of the open bays and into the areas of more rapid tidal flow occurring in the channels between the many islands and peninsulas of the Maine coast. It was believed that since the herring is a very skittish and easily-frightened fish and that since schools of them are often driven by predator fish, an apparatus that would set up a commotion in the water could possibly be used to frighten and thus guide or drive herring from inaccessible locations to favorable seining sites. To set up a controlled disturbance, experiments with a curtain of air bubbles discharged at the water's bottom were started in the fall of 1957.

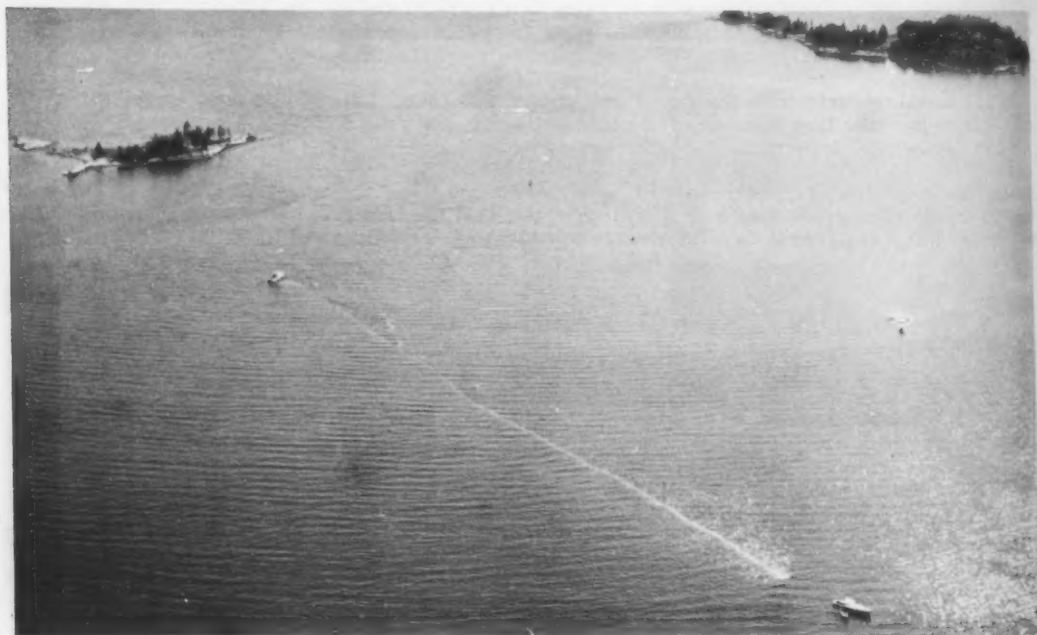


Fig. 3 - Photograph of a 200-fathom-long air-bubble-curtain in Boothbay Harbor.

The initial equipment used in these trials consisted of:

- (1) a 500-foot length of 1-inch diameter polyethylene plastic pipe, perforated at 1-foot intervals with $\frac{1}{32}$ -inch holes and weighted with lead to make it sink to the ocean floor; and
- (2) an air compressor unit consisting of a 132 cubic-foot-per-minute air compressor coupled to a driving engine. Air from the compressor was led into the perforated pipe

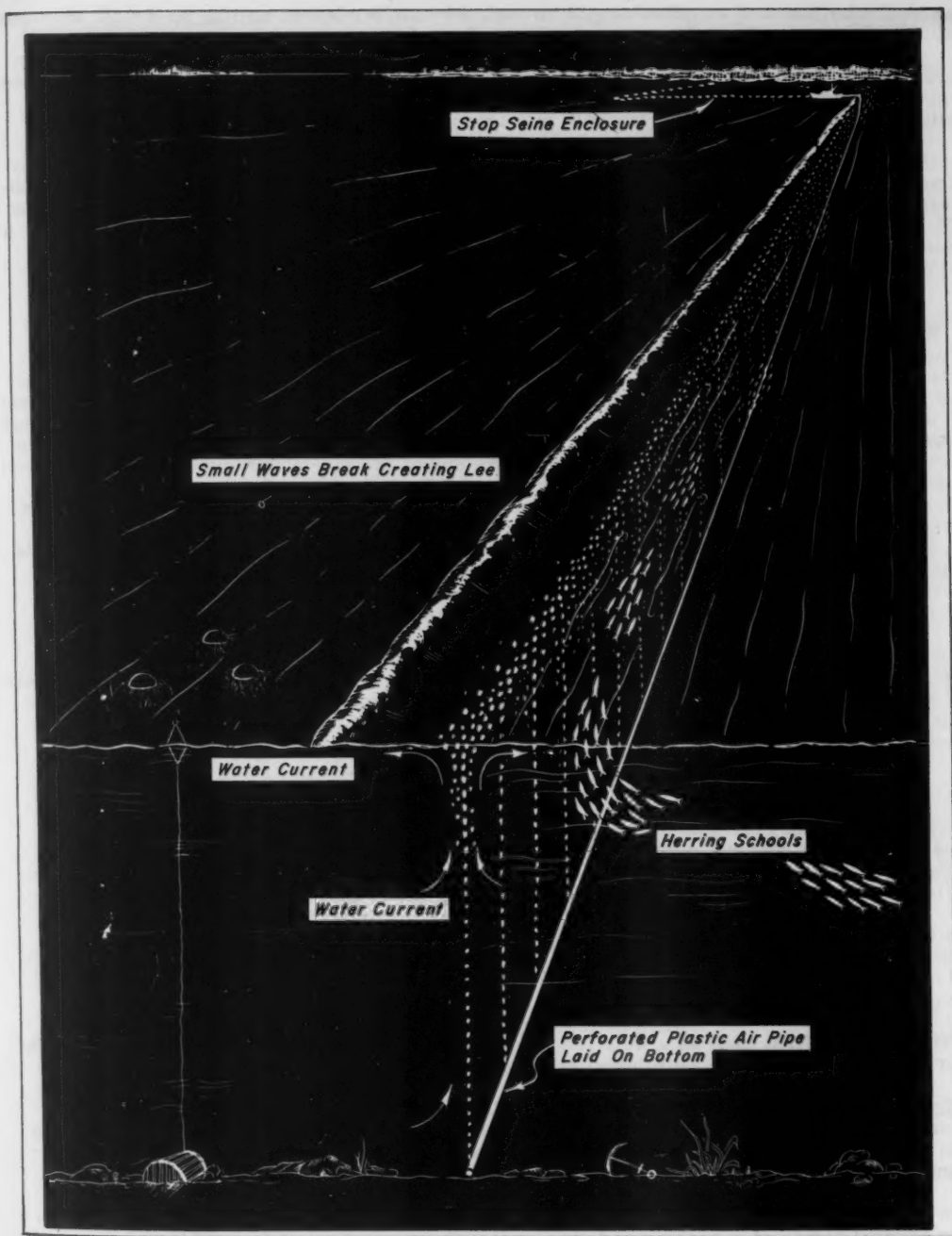


Fig. 4 - Diagram of air-bubble curtain, showing the method of diverting herring schools into a stop-seine enclosure.

lying on the bottom and was discharged through the smaller holes, setting up a wall or curtain of air bubbles rising from the bottom to the surface. 1/

The gear was tried out during the fall of 1957, first on impounded herring and later upon herring schools in their natural state. These initial experiments demonstrated that it was possible to guide and drive herring with this type of apparatus.

During the fall of 1958, an extended air-bubble curtain of 1,200-foot length was tested in Casco Bay near Portland, Maine. At that time, schools of herring were located by aerial observation as they swam through Diamond Island Roads channel, although no catches had been made for several weeks from the stop-seine sites located on each side of the channel. For a period of two weeks, herring schools were watched in the Diamond Island Roads area; yet none of them approached close enough to the shore to be exploited by the stop-seine fishermen.

Working in cooperation with the fishermen, Bureau personnel laid the 1,200-foot air-bubble curtain diagonally out into the Diamond Island Roads channel with one end attached to the fishermen's seines and the other end extending well beyond the center of the channel. When the herring schools began to move down the channel, as was usual during the late afternoon and early evening, they encountered the air-bubble curtain, and rather than pass through it, swam along it and were led shoreward into the shallow water and eventually into the stop-seine enclosures of the fishermen. The offshore end of the air-bubble curtain was then swept ashore forming a loop which was gradually closed. By pulling the entire polyethylene pipe ashore the enclosed fish were driven into the stop-seine sets. This operation was repeated for six nights over a 2-week period, as the Bureau worked with different seine crews, and each action (with one exception) was successful in catching fish that to all appearances could not have been caught in conventional stop-seine gear. Only one set of the gear, made without benefit of aerial observation, was abandoned during this period without a catch of fish, when herring schools failed to materialize as expected.

It was noted during these trials that if the herring were crowded too closely, or were badly frightened, they would pass through the air bubbles to freedom. It was concluded, therefore, that the movement of the plastic pipe must be accomplished slowly and smoothly when the fish are being driven. When the herring have a choice of paths they will avoid passing through the air discharge and thus can be led or driven to points of capture.

USE OF AIR-BUBBLE CURTAIN IN SARDINE FISHERY

The air-curtain gear was introduced to Maine sardine fishermen in 1958 and 1959 by means of progress reports, demonstrations, and assistance to fishing crews interested in setting up their own units. Advice and help have been given to one cooperating sardine company in constructing an experimental 2,000-foot-long unit. This installation utilizes a 196-cubic-foot-per-minute compressor and discharges air through $\frac{1}{4}$ -inch (0.0156")-diameter holes in $\frac{3}{4}$ -inch and $\frac{1}{2}$ -inch polyethylene pipe. Air pressure at the compressor was held at approximately 70 pounds per square inch. Although fish were very scarce in the most eastward section of the Maine coast, where this unit was used in 1959 some valuable catches were made.

The unit was first used as a weir lead to guide herring schools from deeper water at the center of a cove over to the weir installation adjacent to the bank.

Schools retreating at ebb tide from the shallow inner end of the cove encountered the air curtain, followed along it, and were led to the weir entrance. In their continuing search for an unobstructed escape route to deep water they moved through the weir entrance passage and were captured.

In another location, herring schools were found to be lying near the mouth of a cove but during several nights of searching and observation they remained at depths beyond the reach ^{1/A carburetor device was installed to add chemical irritants to the compressed air to assist in driving the herring; and a supply of carbon dioxide, formaldehyde, and tear gas was procured for use in the air discharge, but use of these materials did not prove necessary.}

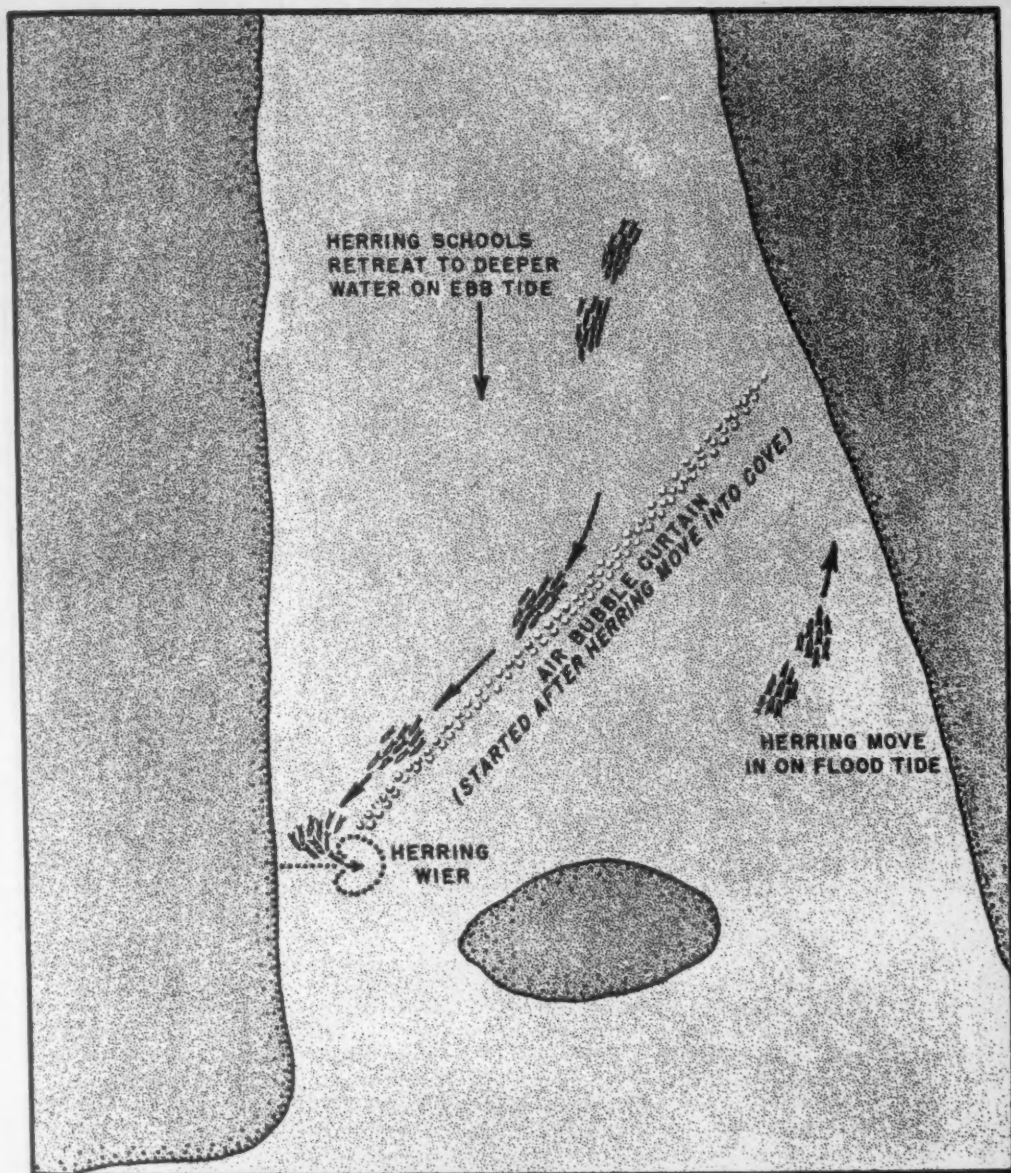


Fig. 5 - Operation of an air-bubble curtain used with a herring weir.

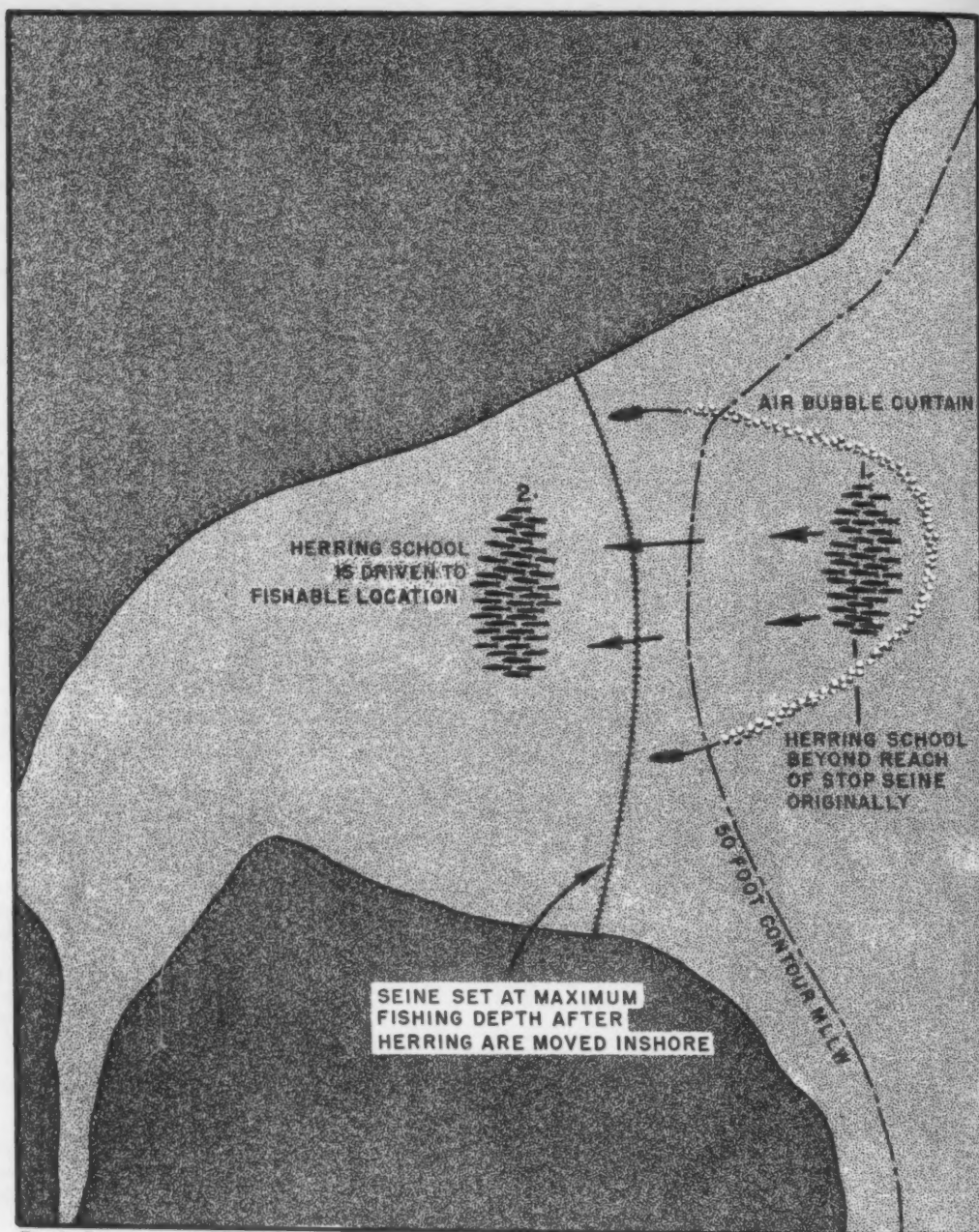


Fig. 6 - Diagram showing the air-bubble curtain as it was used to drive herring schools to a seining site from water depths beyond the range of stop-seine gear.

of stop-seine gear. Since this was an area of smooth bottom, the polyethylene pipe was looped around a part of the school and towed shoreward, driving the herring into the cove to a point where they could be enclosed with a stop seine.

A seine crew also used air-curtain gear in the Casco Bay area near Portland to take fish from areas beyond the reach of their seines. During one week of short herring supply in the 1959 season, most of the herring delivered to Portland, Maine, canneries came from catches made with air-curtain gear in the Casco Bay location.

In all, a dozen or more air-curtain units have now been installed by fishermen in Maine and New Brunswick. At least four of these were used in actual operations during the 1959 season, and good catches were made in at least three areas where conventional gear would have been of no use. Other units were not used during the 1959 season, owing to the scarcity of herring schools. It is expected that, with six or more new, well-designed units now going into operation, the method will be applied with increasing effectiveness in the 1960 and succeeding seasons.

ASSEMBLY METHODS

The appendix lists the materials needed to complete a 400-fathom and 250-fathom air-bubble curtain. Reference to the appendix will aid understanding of assembly methods and facilitate construction. The following abbreviations are used throughout this section and in the appendix:

- (1) psi. - pounds per square inch
(air pressure).
(2) cfm.- cubic feet per minute
(of air).

- (3) hp. - horsepower.
(4) rpm. - revolutions per minute.

AIR COMPRESSOR: The heart of air-curtain equipment is the air-compressor-engine unit. In choosing an engine to drive the compressor it is most important to select one of sufficient horsepower to run the compressor continuously. For this reason one must be concerned only with the continuous shaft or brake horsepower. The internal top speed horsepower ratings of engines listed by many manufacturers should not be considered in making this selection since this rating is much higher than can be supplied under working conditions.

Whether the compressor is belt-driven or direct-driven, the maximum rated rpm. of the compressor should be reached when the engine is running at its best continuous operating speed. Engine and compressor speeds may be easily regulated by adjusting the pulley sizes using the formula

$$\frac{\text{engine speed (rpm.)}}{\text{compressor speed (rpm.)}} = \frac{\text{pitch diameter of compressor pulley}}{\text{pitch diameter of engine pulley}}$$

If the compressor is direct-driven, the operating speed of the engine must match that of the compressor.

SAFETY AND EXHAUST VALVES: At the air outlet of the compressor a safety valve and air pressure gauge should be installed. Also at this point a pressure relief valve must be installed on a T fitting in the main air line to allow the compressed air to exhaust freely into the open atmosphere as the compressor is started. This exhaust valve should be closed slowly after the compressor has been started to gradually increase the pressure of the air delivered to the perforated plastic pipe lying at the sea bottom. The plastic pipe will be full of water at the start of the operation, and the water must be forced out gradually by closing the exhaust valve to increase the pressure. The safety valve should be mounted in another T fitting adjacent to the exhaust valve and should be set to open at the maximum compressor pressure or the maximum plastic pipe rating (75 psi.), whichever is lowest.

AFTERCOOLER: The compressed air should be piped, preferably with steel pipe, from the compressor to an aftercooler. If any hose connections are made in this run only a good grade of steam hose or heat resistant compressed air hose of 100 psi. or higher pressure rating should be used, and all connections should be doubled clamped and securely fastened. The aftercooler should be constructed of corrosion-resistant metal and should be of sufficient capacity to cool 196 cfm. of air compressed to 80 psi. pressure down to within 10 degrees of the cooling water. If a larger compressor supplying a greater volume of air is used, the size and cooling capacity of the aftercooler must be correspondingly increased.

An alternative method of cooling the compressed air is to pipe it through copper tubing that is kept overboard and submerged in the sea water in the "keel cooler" fashion. One cooler of this type made up with five 6-foot lengths of 1½-inch copper tubing joined together with 180° return-bend fittings has worked quite satisfactorily with a 130-cfm. compressor. An advantage of this method is that no water pump or hoses are needed for cooling the air. A similar type of cooler using a total length of 45 feet of 1½-inch copper tubing would be sufficient for cooling air from the 196 cfm. compressor.

POLYETHYLENE PIPE SECTIONS: The undrilled 100-foot length of 1-inch plastic pipe should be connected to the outlet of the aftercooler as a lead-in section to the drilled lengths. The drilled sections should then be connected in the order listed in the appendix. These sections may be connected by means of insert couplings and stainless-steel hose clamps. Metal (brass or galvanized steel) insert couplings should be used rather than the plastic type, because the metal types have thinner walls and provide a larger inside diameter for air flow. Insert couplings are available also as reducing couplings for changing the diameter of plastic pipe.

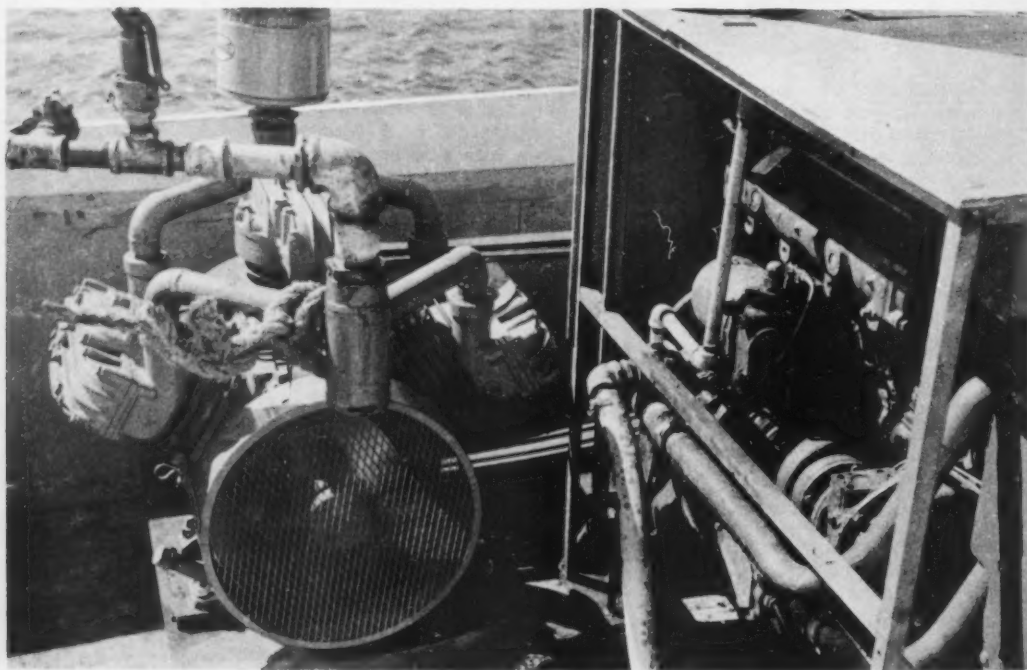


Fig. 7 - A 196 cfm. (free air rating) air compressor unit. The engine is a 52 hp. 4-cylinder diesel. Compressor is 3-cylinder single stage model, maximum pressure 80 psi.

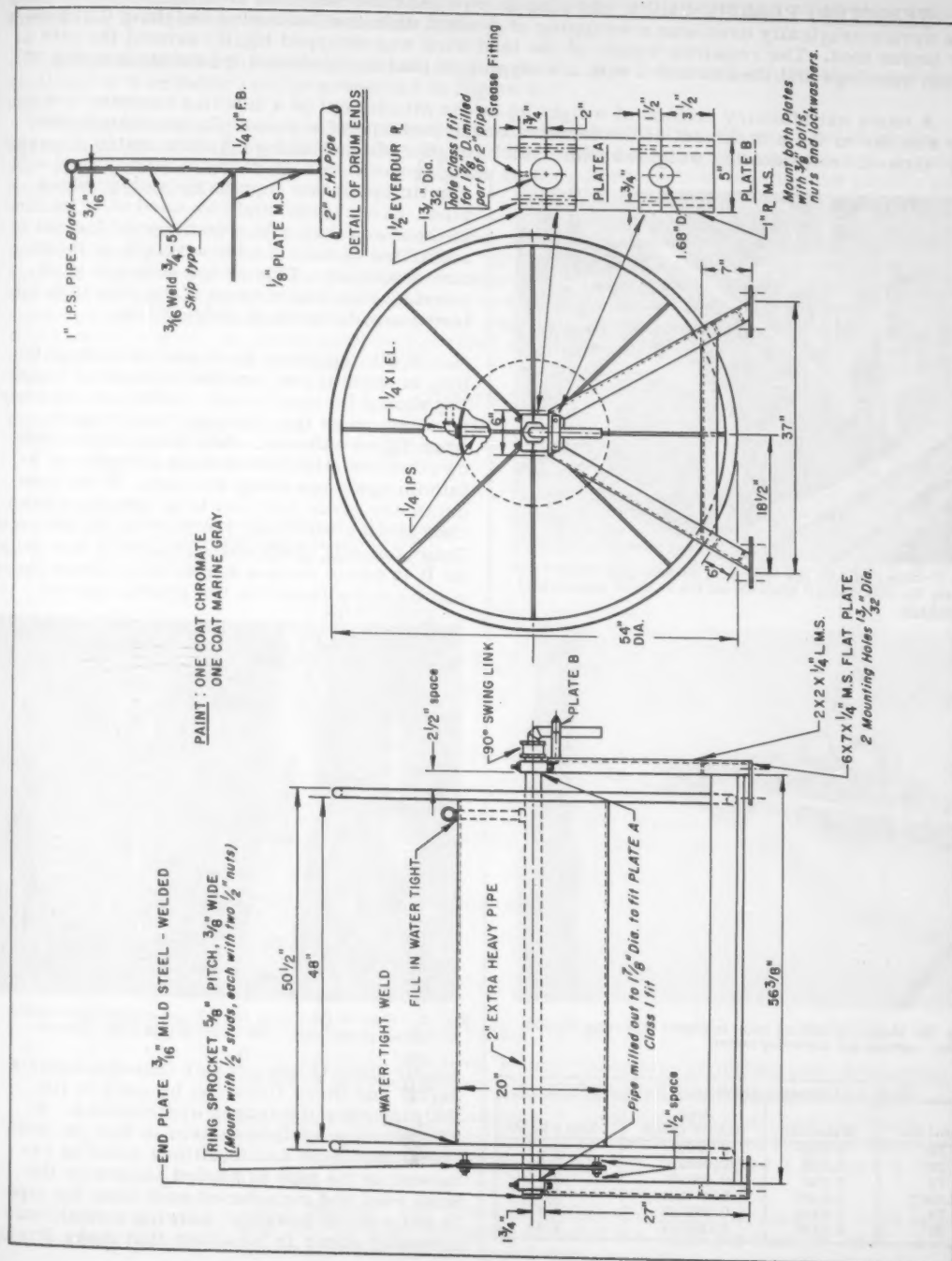


Fig. 8 - Drawing of plastic pipe reel for handling 400 fathoms of air-curtain equipment.

WEIGHTING PLASTIC PIPE: The plastic pipe must be weighted to sink it to the bottom. The device originally used was a wrapping of $\frac{3}{16}$ -inch diameter lead wire weighing 0.125 pound per linear foot. The required weight of the lead wire was wrapped tightly around the pipe at 4-foot spacings and then covered with a wrapping of plastic electrical insulation tape (fig. 10).

A more satisfactory method of weighting is the attachment of a leadline in a manner similar to the attachment of the leadline to the footrope of a seine. In one installation, a $\frac{3}{16}$ -inch-dacron line was weighted with 6-inch lengths of lead tubing ($\frac{1}{16}$ -inch inside diameter and $\frac{3}{16}$ -inch outside diameter) and taped with plastic insulation tape to the polyethylene pipe. Seine leads could be used on a leadline in the same way. An advantage of the use of a leadline is that it adds strength to the entire assembly. This added strength is of considerable importance if the pipe is to be towed any distance in driving fish.

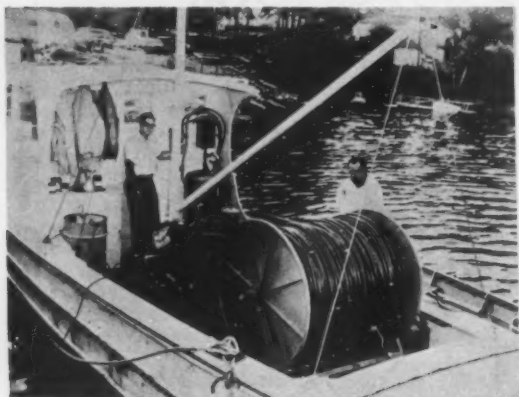


Fig. 9 - Hose reel with 200 fathoms of weighted polyethylene pipe ready for experimental trials aboard the Bureau's research boat Blueback.

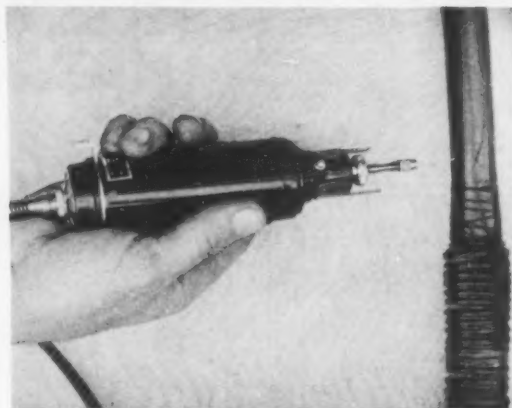


Fig. 10 - Method of drilling holes in plastic pipe using 27,000-rpm. carving and engraving motor.

Table 1 - Diameters and Areas of Numbered Drills			
Drill No.	Diameter	Area Square Inches	Area x 10,000
76	0.020"	0.000314	3.14
77	0.018	0.000254	2.54
78	0.016	0.000201	2.01
(1/64")	0.0156	0.000191	1.91
79	0.0145	0.000165	1.65
80	0.0135	0.000143	1.43

If the pipe is to be towed over rough bottom in normal use, another system of weighting should be considered. Sufficient lead may be attached so that the pipe barely floats when filled with air. Additional seine leads can then be attached on rope pendants at 5-fathom spacings along the pipe. If the pendants are made two feet long, the air discharge pipe will float two feet above the sea's floor and will clear obstructions of that height as it is swept across the bottom. Seine floats can be also attached to the plastic pipe on

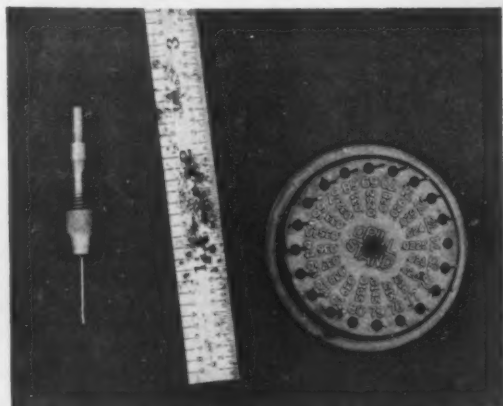


Fig. 11 - Drill set (No. 61 to No. 80) and special chuck needed for drilling plastic pipe. The chuck is part of the drill set.

longer lines (lines greater than the water's depth) and these lines can be used to lift the pipe over the larger obstructions. A disadvantage of this system is that the additional leadlines and floatlines must be removed as the pipe is hauled aboard on the hose reel and refastened each time the pipe is set out. If however, herring schools consistently occur in locations that make driving

them over a rough area necessary for capture, it would be well-worth the added time required for making a set to rig the leads in this fashion.

A reel is needed for setting and hauling the plastic pipe. General information on the construction of a suitable reel is presented in figure 8.

Experience has shown that air connections through the reel as shown in the diagram are not completely necessary, but that they do ease the work of hauling the pipe aboard, because the air pressure can be kept applied during the hauling process thus keeping the plastic pipe from filling with water.

A reel of another design, or of other material (such as plywood), might serve as well as the one described--provided it has sufficient capacity. The reel should be power driven if possible to make the job of hauling the pipe aboard fairly fast and easy. A hydraulic drive was used on the original experimental model and was found excellent, but any other good drive system of approximately 5-horsepower capacity, geared to turn the reel 30 to 60 rpm., would work as well. A clutch must be provided on any mechanical-drive system to allow intermittent starting and stopping of the reel.

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APPENDIX: EQUIPMENT LIST

A. EQUIPMENT FOR A 400-FATHOM AIR-BUBBLE CURTAIN

1. Compressor: Capacity 196 cfm. or higher (free air rating). Pressure rating 80 psi. or higher.
2. Compressor engine: Gasoline, 30 to 50 continuous brake hp., or shaft hp., air or water cooled.
3. Aftercooler: Compressed-air pipe-line aftercooler, capable of cooling 196 cubic feet per minute of air to within 10°F., of the temperature of the cooling water.
4. Exhaust valve: One-inch-diameter pipe size.
5. Safety valve: Set to open at 75 psi.
6. Air-pressure gauge: Containing a 0-150 psi. scale.
7. Polyethylene plastic pipe: Pressure rating, 75 psi.

First Section: 100 feet, 1-inch-diameter, undrilled and unweighted, attached between aftercooler and drilled sections.

Second Section: 100 fathoms, 1-inch-diameter, drilled at 1-foot spacings with No. 80 drill, weighted with 8 ozs. of lead per foot (to sink completely to bottom). Leads can be attached 2 lbs. per 4-foot spacing.

Third Section: 100 fathoms, $\frac{3}{4}$ -inch-diameter, drilled at 1-foot spacings with No. 79 drill, weighted with 0.3 lbs. lead per foot (to sink). Lead can be attached 1.5 lbs. per 5-foot spacing.

Fourth Section: 100 fathoms, $\frac{3}{4}$ -inch-diameter, drilled at 1-foot spacings with No. 78 drill, weighted with 0.3 lbs. lead per foot (to sink).

Fifth Section: 100 fathoms, $\frac{1}{2}$ -inch-diameter, drilled at 1-foot spacings with No. 78 drill, weighted with 0.2 lbs. lead per foot (to sink).

8. Hose Reel: Revolving drum 4 feet long, 54-inch-diameter with 20-inch-diameter core. This may be of wood or metal construction and should be power driven for easiest operation (figs. 10 and 11).
9. Self-priming $\frac{3}{4}$ -inch-pump: (neoprene impeller type) to supply cooling water for after-cooler, belt driven by compressor engine or other engine.

B. EQUIPMENT FOR 250-FATHOM AIR-BUBBLE CURTAIN

1. Compressor: 130 cfm. or higher rating, 80 psi. or higher maximum pressure.
2. Compressor engine: 25 hp. gasoline engine, continuous shaft hp., or 15-hp. electric motor.
3. Aftercooler: Pipe-line aftercooler of sufficient capacity to cool 130 cubic feet per minute of air to within 10°F. of the temperature of the cooling water.
4. Exhaust valve
5. Safety valve
6. Air pressure gauge: 0-150 psi. scale.

7. Polyethylene plastic pipe: 75 psi. pressure rating:

First Section: 100 feet, 1-inch-diameter, undrilled and unweighted attached between aftercooler and drilled sections.

Second Section: 100 fathoms, $\frac{3}{4}$ -inch-diameter, drilled at 1-foot spacings with No. 80 drill and weighted with 0.3 lbs. of lead per foot of length.

Third Section: 100 fathoms, $\frac{3}{4}$ -inch-diameter, drilled at 1-foot spacings with No. 79 drill and weighted with 0.3 lbs. of lead per foot of length.

Fourth Section: 50 fathoms, $\frac{1}{2}$ -inch-diameter, drilled at 1-foot spacings with No. 78 drill and weighted with 0.2 lbs. of lead per foot of length.

8. Hose Reel: Revolving drum 3 feet long, 54-inch-diameter with 20-inch-diameter core, otherwise as described above for 400-fathom unit.
9. Self-priming $\frac{3}{4}$ -inch-pump: (neoprene-impeller type) for aftercooler water.

C. SPECIAL TOOLS FOR DRILLING PLASTIC PIPE

Special small drills, chuck and drill motor are needed for boring the very small holes in the plastic pipe. A high-speed motor from a carving and engraving set was found to be most satisfactory for this use. A set of drills, No. 61 through 80 and a special small chuck to adapt the drill motor chuck to the small drills (figs. 10 and 11 and table 1) are also needed. These tools can likely be obtained from a hobby shop, a well-stocked hardware store or a mail-order house.



A PRACTICAL CHEMICAL METHOD FOR KILLING MUSSELS AND OTHER OYSTER COMPETITORS

By Clyde L. MacKenzie, Jr.*

BACKGROUND

During the summer of 1959 there was an unusually heavy set of mussels (*Mytilus edulis*) on many oyster beds along the Connecticut shore of Long Island Sound. The mussels threatened to smother oysters, especially young ones, and to damage the beds by accumulating on them large amounts of silt. As a result, several oyster companies requested information on how to kill the mussels either on the beds or during transplanting operations.

Meanwhile, to save the crop of oysters, one company used deckhands to remove mussels manually as the oysters were transplanted. Dredged-up bottom material, which averaged 332 mussels per bushel, could be processed by deckhands in about 17 minutes per bushel at a labor cost of 42.5 cents. When mussels averaged only 156 per bushel, the material could be processed in 6 to 7 minutes, at a labor cost of 15 to 17.5 cents per bushel. Working at this rate, however, deckhands removed only about 57 percent of the mussels; this means that about 140 mussels per bushel were left in bottom material in which the original count was 332.



Fig. 1 - Deck hands at culling board on a boat removing mussels manually from oysters and other dredged-up material.

Later in the summer, after mussels grew larger, about 80 percent of them were removed by hand (fig. 1). It is estimated that to remove 95 to 100 percent of mussels averaging 332 per bushel, deckhands would have to spend approximately 48 minutes, at a labor cost of \$1.20 per bushel.

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It was shown several years ago by V. L. Loosanoff (personal communication) and co-workers, J. E. Hanks, A. E. Ganaros, and L. W. Shearer, that the dye Victoria Blue will kill mussels, annelids, tunicates, gastropod embryos, and other invertebrates. MacKenzie and Shearer (in press) have since reported in detail its effects on *Polydora websteri* and other annelids. Victoria Blue is virtually insoluble in sea water but forms a suspension of fine particles when it is stirred. It has been used routinely for 5 years to kill mussels, tunicates, and annelids in hatchery troughs at Milford Laboratory.

Victoria Blue was not recommended to the industry as a practical means of killing mussels for two reasons. First, it was believed that such competitors had to remain in a solution of the dye for several hours to acquire a toxic dosage. Thus, mussels were immersed for 3 hours in a dye concentration of 10 parts per million to kill them. Obviously, it would be impractical for an oysterman, who may handle several hundred bushels of oysters a day, to hold them for such a long period in large tanks of the dye. The second, and even more important consideration, was that oysters, themselves, during a long immersion, may open and receive a lethal dosage of Victoria Blue.

EXPERIMENTAL

Use of a chemical would be practical for an oysterman if it were sufficient to dip the dredged material, composed of oysters and mussels, in a tank of the chemical solution aboard his boat, and then store the material so treated on deck while he finishes loading and later proceeds to another ground to plant it. In this type of handling an oyster has an advantage over a mussel because its shells are closed completely while immersed in the solution, whereas a mussel has an open slit between its shells at the byssal notch through which the byssal threads protrude, and through which the chemical may reach the body tissues of the mussel. Hoping to take advantage of this anatomical difference, we dipped mussels in solutions of Victoria Blue (Niagara-3475) for 5 seconds and then stored them in air. Examination of mussels soon after this treatment showed, as suspected, particles of dye at the edge of the mantle



Fig. 2 - Deck hand on oyster boat using method, which consists of dipping bottom material (foreground) for 5 seconds in weak chemical solution, draining it briefly, and then storing it on deck of boat (background).

near the notch, in the fluid within the mantle cavity of the mussels, and on the gills and other parts of their bodies. Later, these parts were dyed blue. Probably a portion of the dye had entered the mussels during the immersal period but most of it was retained on the byssal threads and gained access to the mussel along these threads while it was stored in air.

Since there are a number of preparations known as Victoria Blue, we conducted experiments to determine which of these is most toxic to mussels. Victoria Blue Bis the strongest one. In a test with it in a 5-percent suspension, 100 percent of mussels were killed by a 5-second dip and a 24-hour drying period. In similar tests with Niagara-3288, 91 percent died; Niagara-3475 killed 66.7 percent; Victoria Blue 4R, 17.6 percent; Victoria Blue R, 6.3 percent; and Victoria Blue B Base did not kill any mussels. Victoria Blue B was tried at 5 different concentrations and percentage mortalities of mussels were recorded as follows: 4-percent suspension, 100; 3-percent suspension, 95; 2-percent suspension, 88; 1-percent suspension, 55; and 0.5-percent suspension, 38.

In a field test, conducted in cooperation with a local oyster company, approximately 150 bushels of dredged-up bottom material, which contained 332 mussels per bushel, were dipped in a 0.5-percent suspension of Victoria Blue for 5 seconds and stored in air for 24 hours (fig. 2). In this test Niagara-3475 was used because it was available in large quantities. The results were poor; only 40 percent of the mussels died. We were encouraged, nevertheless, because every live mussel we opened had some of its organs stained blue. This showed that the dye was getting inside the mussels although it was not poisonous enough to cause the death of all of them.

In testing other chemicals we found that copper sulfate will kill mussels and several other oyster competitors, including annelids, *Crepidula*, and tunicates. We conducted an experiment using copper



Fig. 3 - Dying mussels and healthy 2-year-old oysters after treatment in one-percent solution of copper sulfate.

sulfate at concentrations of 0.5, 1.0, 2.5, and 5.0 percent. Mussels and oysters of 3 year classes were dipped for 5 seconds and then stored in air for approximately 6 hours, 24 hours, and 48 hours. One-year-old oysters used in this test averaged 22 mm. in length; 2-year-olds, 54 mm.; and 3-year-olds and older, 84 mm. One set of controls was not dipped but was kept in air for approximately 1 day; the other set was not dipped but cleaned of mussels manually and shoveled twice onto a screen which normally removes loose single mussels from the material dredged from oyster beds.

In concentrations of copper sulfate of 0.5 and 1.0 percent, regardless of the length of storing period, mortality of 2- and 3-year-old oysters was not greater than in controls, while the percentages of mussels which died were high (table 1, fig. 3). However, mortality of 1-year-old oysters was greater as a result of the treatment than in controls. Copper sulfate solutions at strengths of 2.5 and 5.0 percent killed nearly all mussels, but also killed

many oysters. These experiments show, therefore, that solutions of copper sulfate employed to control mussels should be less than 2.5 percent. We recommend solutions containing between 0.5 to 1.0 percent, if mussels can be kept out of water for 24 hours or longer after dipping, and 1.0 to 2.0 percent solutions if they can be stored only a few hours. Young oysters, measuring 22 mm. in length or less, are too small to dip in the solution even if it contains only 0.5 percent of copper sulfate.

Oysters and mussels used in this experiment were handled roughly. They were dredged up, shoveled into baskets, dipped, and then dumped into bags for storage aboard the boat. Apparently oysters which have been handled roughly close their shells more tightly and have a better seal between their bodies and the outside. In another experiment in which 2-year-old oysters were taken gently from a suspended tray, one at a time, dipped for 5 seconds in a 1.0-percent copper sulfate solution, and dried for 24 hours, a 40-percent mortality was recorded.

We have also tried dipping mussels in a saturated salt solution because Loosanoff (1957) and Shearer and MacKenzie (in press) have shown that short immersions in a saturated salt solution were effective in killing a variety of oyster competitors. However, a 5-second dip followed by 24 hours of drying will not kill mussels. Most other species of competitors and also some predators, nevertheless, were killed by dipping for 5 seconds in salt solutions 98 to 100 percent saturated. The minimum drying periods necessary to achieve complete mortality under these conditions are given in table 2. Comparing these data with the papers cited above on the effects of salt, it can be seen that prolonged immersion in a salt solution kills animals much faster than storage in air following a 5-second dip. For example, experimental groups of *Molgula manhattensis* were killed by a continuous immersion of 5 to 10 minutes, while it took 2 hours of drying after a 5-second dip to kill them. For starfish, it was 3 minutes against 8 hours. It is usually more feasible, however, for the oysterman, to store dipped material on deck for as long as 8 hours than it is to hold the material in tanks of chemical for 5 to 10 minutes.

Preliminary data from experiments using a completely saturated salt solution containing an excess of salt crystals in suspension show that competitors and predators are killed with much shorter drying periods than are required using a saturated salt solution with no excess of salt crystals present. Thus, starfish dipped for 5 seconds in a saturated solution containing an excess of 250 grams of salt per liter were killed by 2 hours of drying following a 5-second dip. The greater the excess of salt, the quicker is the kill. With 500 grams in excess, only 30 minutes were required, and with 1,000 grams in excess, starfish were killed after only 5 minutes of drying. The probable explanation for this is that when a salt solution with no crystals is used, the body fluids leaving an animal by osmosis dilute it and thus weaken its strength. When excess crystals are present, however, the

Table 2 - Minimum Periods of Storage in Air to Cause 100-Percent Mortality of Animals After They Were Dipped for 5 Seconds in Completely Saturated Salt Solutions With No Excess of Salt Crystals in Suspension

Species	Storage Time in Hours
<i>Polydora websteri</i>	3
Boring sponge	3
<i>Molgula manhattensis</i>	2
<i>Botryllus</i> sp.	1
<i>Stylochus ellipticus</i>	15 seconds
<i>Crepidula fornicata</i>	8
<i>Crepidula plana</i>	7
Mud crabs	1.5
Worm tubes	2
<i>Urosalpinx cinerea</i> (embryo cases)	6
Starfish	6
<i>Obelia</i> sp.	few seconds

Table 1 - Percentage Mortality of 1-Year-Old Mussels and of Oysters of 3 Year Classes After Being Dipped for 5 Seconds in Different Concentrations of Copper Sulfate and Then Stored in Air

Percentage Concentration of Copper Sulfate	Hours of Storage	Mussels	Age of Oysters			
			1 Year	2 Years	3 Years	
TREATED						
0.5	{	6	89	10	1	0
		30	89	22	6	0
		54	94	22	5	5
1.0		5.5	93	20	2	2
		30	99	17	3	7
		54	98	24	5	7
2.5		5	99	40	11	12
		30	100	30	22	6
5.0		4	100	53	33	44
		27	100	63	50	39
CONTROL						
Not dipped		29		15	3	0
Cleaned of mussels manually,	24		14	2	0	
not dipped	48		10	5	0	

Dipping material in a chemical solution followed by a period of storage in air is not a new method of killing predators and competitors of oysters. In Long Island Sound, Loosanoff

and Engle (1938) have killed starfish by dipping them in suspensions of common lime. Walne (1956), in England, dipped limed tiles, on which oysters and various competitors had set, for a few seconds in a 0.4-percent copper sulfate solution. He reported that most competitors, particularly tunicates, died after 1 to 2 hours of drying. Similarly, Loosanoff (1957) showed that starfish and boring sponges can be killed if they are sprayed with a saturated salt solution and then stored in air.

DISCUSSION

It would seem that the method of dipping and air storage of transplanted material can easily become a part of oyster culture because of its effectiveness in killing competitors and certain predators and because it is extremely cheap and simple. For example, in the field test conducted in cooperation with the local oyster company, to kill mussels by using Victoria Blue, 2 deckhands did the complete job, including mixing of the chemical and dipping approximately 150 bushels of bottom material into 25-gallon drums of the dye, in 3 hours. At \$5.85 per pound for the dye and \$1.50 an hour for labor, it cost 12 cents a bushel for the treatment, 6 cents for the chemical, and 6 cents for labor. This cost could have been lower if the deckhands had had more experience in performing this operation, and if excess dye had drained back into the drums for re-use.

The cost of treatment per bushel of dredged material would have been considerably lower, approximately 6 cents, if copper sulfate, which costs only 10 to 15 cents per pound, had been used. This conclusion is based on the following estimates: Twenty-five gallons of copper sulfate solution will treat 100 bushels of dredged material. Two pounds of this chemical in 25 gallons of sea water make a 1-percent solution. Thus, 20 to 30 cents worth of copper sulfate will be enough to treat 100 bushels of the material. Therefore, we recommend copper sulfate rather than Victoria Blue because it is much cheaper and easier to handle.

We also recommend that the treated material be drained after dipping.

The manager of the oyster company which cooperated with us in these experiments estimated that his company could handle more than 10 times as much material by using the dipping method than it can by removing mussels manually. If the boats were rigged in such a way that it were possible to dip each 10- to 15-bushel dredge load in a tank of chemical before emptying the dredge on deck, the method would add little work to transplanting operations.

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Note: I wish to thank The Sealship Corp., and particularly Mr. Emil W. Usinger, Manager of their Milford branch, for helping to develop this method for use on a commercial scale and for his wholehearted cooperation in various tests conducted with his company.



TRENDS AND DEVELOPMENTS

Alaska

NEW REGULATION PERMITS COMMERCIAL ABALONE FISHING:

A regulation authorizing commercial abalone fishing in Southeastern Alaska was signed on February 3, 1961, by the Commissioner of the Alaska Department of Fish and Game.

Under provisions of the regulation, prospective abalone fishermen must obtain a permit from the Commissioner of the Department of Fish and Game. The regulation also establishes a legal minimum size of three inches in greatest diameter of the shell.

The regulation was promulgated in order to legalize abalone fishing this winter in response to a mounting interest in harvesting it commercially.

The Alaska Board of Fish and Game will review the abalone situation during its regular spring meeting, and at that time, will consider permanent regulations.

The Alaska or pinto abalone is found in Pacific coast waters from California to Cross Sound. It is rare in California and more abundant in Alaska, but the extent and size of the population has not been determined.

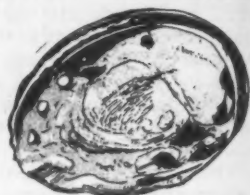
The Alaska abalone is separate and distinct from the well-known commercial abalones of California. The abalones found in Alaskan waters are much smaller and attain a maximum size of only six inches in greatest diameter.

Virtually nothing is known about the life history of this shellfish, but Department biologists will be working with specimens obtained from the commercial fishery and with the fishery itself to determine the information necessary for proper management.

It is known that red abalones, the most important commercial species in Cali-

fornia, are slow-growing animals which require as long as 13 years to attain the legal taking size.

Alaska biologists have recommended a legal minimum size of three inches in order to assure an adequate brood stock.



RED ABALONE SHELL
Haliotis rubescens

"As our knowledge of this animal increases, it may be necessary to change the minimum three-inch size requirement," the Commissioner stated. "In any event, it is our intention to manage the abalone fishery in accordance with sustained-yield principles. If a commercial fishery proves to be biologically and economically feasible, Alaskans may soon be able to enjoy this delicacy at their tables," he added.



Byproducts

U. S. PRODUCTION OF FISH MEAL, OIL, AND SOLUBLES, 1959-60:

The United States production of fish meal in 1960 amounted to 257,969 short tons, a decline of 8.6 percent as compared with the

U. S. Production of Fish Meal, Oil, and Solubles, 1959-60			
Product	Unit	1960 ^{1/}	1959 ^{2/}
.... (Quantity)			
Meal and Scrap:			
Herring:			
Alaska	Tons	4, 126	8, 094
Maine	"	2, 447	3, 519
Menhaden	"	214, 387	223, 893
Sardine, Pacific ..	"	3, 639	2, 927
Tuna and mackerel	"	21, 633	25, 380
Unclassified	"	11, 737	18, 431
Total	"	257, 969	282, 244
Fish solubles	"	90, 054	136, 662
Homogenized-condensed fish ..	"	9, 551	28, 697

(Table continued on next page)

U. S. Production of Fish Meal, Oil, and Solubles, 1959-60 (Contd.)			
Product	Unit	1960 ^{1/}	1959 ^{2/}
..... (Quantity)			
Oil, Body:			
Herring:			
Alaska	Gallons	1,031,760	1,778,248
Maine	"	163,526	180,900
Menhaden	"	23,675,111	20,628,278
Sardine, Pacific ..	"	161,636	187,938
Tuna and mackerel	"	598,205	601,010
Other (including	"		
whale)	"	1,059,386	1,568,608
Total	"	26,689,624	24,944,982

^{1/} Preliminary. Data from firms which accounted for 92 percent of the production. The total production of fish meal in 1959 amounted to 306,551 tons.

^{2/} The 1959 production includes revisions.

282,244 tons produced in 1959. However, the production of fish body oils (including whale oil) of about 26.7 million gallons was up 7.0 percent from the 1959 production of about 24.9 million gallons. Production of both fish solubles and homogenized-condensed fish was down sharply--34.1 and 66.7 percent, respectively--from the amounts produced in 1959.

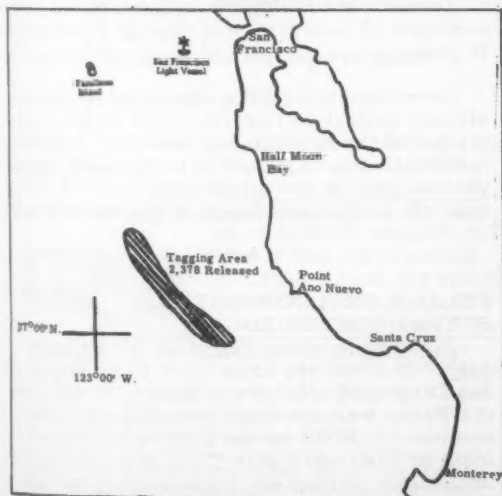
Note: Also see Commercial Fisheries Review, March 1960 p. 16.



California

PETRALE SOLE TAGGING STUDIES:

M/V "N. B. Scofield" Cruise 60-S-6-Trawl:
The coastal waters between San Francisco and



M/V N. B. Scofield Cruise 60-S-6-Trawl (Nov. 15-Dec. 20, 1960).

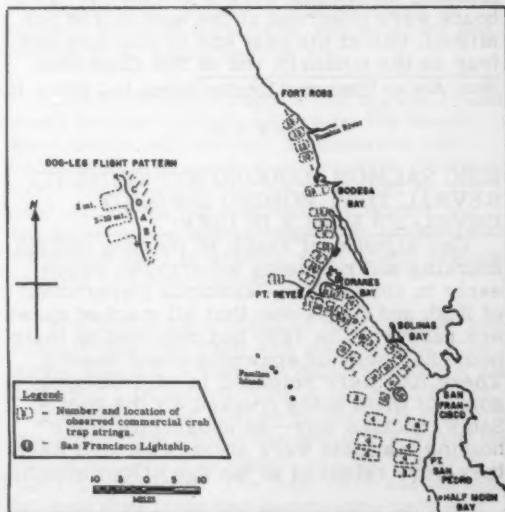
Santa Cruz were surveyed (November 15-December 20, 1960) by the California Department of Fish and Game research vessel N. B. Scofield to tag petrale sole (*Eopsetta jordani*) as part of a coastwide program of identification of sub populations, and to collect specimens for various investigations.

The cruise was carried out during a period of southerly storms which made trawling difficult. In spite of adverse weather, 2,378 petrale sole were tagged and released in depths of 164 to 225 fathoms offshore between Half Moon Bay and Año Nuevo Island. All fish were tagged with vinyl-spaghetti tubing.

Returns were being received from San Francisco commercial fishermen before termination of tagging operations. Valuable information on seasonal distribution will be gained from these and future returns.

CRAB FISHING AREA AND INTENSITY STUDIES CONTINUED:

Airplane Spotting Flight 60-25-Crab:
The commercial crab-fishing areas from Half Moon Bay to Fort Ross were surveyed from the air in December 5, 1960, by the California Department of Fish and Game Cessna 182 to determine the early season fishing localities and the relative density of crab gear off central California.



Flight report Cessna 182, 60-25-Crab (December 5, 1960).

The 298 lines of crab gear counted were distributed as follows: 17 percent between Ft. Ross and Bodega Bay; 30 percent between Bodega Bay and Pt. Reyes; 39 percent between Pt. Reyes and the San Francisco Lightship; and 14 percent between the San Francisco Lightship and Half Moon Bay.

The amount of gear observed was 3.5 times as much as in the same area a year ago, after the season opened in the Eureka region (December 20-21, 1959). This high concentration was caused by Eureka-Crescent City crab fishermen fishing off Bodega Bay and San Francisco while waiting for the season to open in northern California.

Note: Also see Commercial Fisheries Review, August 1960, p. 15.

INVESTIGATION OF ABALONE RESOURCES CONTINUED:

Airplane Spotting Flight 60-26-Abalone:

The shoreline from Monterey to Morro Bay and all of the Channel Islands except San Nicolas was surveyed from the air on December 15, 1960, by the California Department of Fish and Game Twin Beechcraft to locate areas of winter commercial abalone diving.

No divers were observed along the shoreline from Monterey to Morro Bay where ground swells were high. Among the Channel Islands, the swells were much lower. Two boats were observed at the east end of San Miguel, one at the east end of Anacapa and four on the southern end of San Clemente.

Note: Also see Commercial Fisheries Review, Jan. 1961 p. 18.

KING SALMON MARKING EXPERIMENTS REVEAL THAT HOMING INSTINCT DEVELOPS EARLY IN LIFE:

One significant result of the king salmon marking and releasing experiment begun early in 1959 by the California Department of Fish and Game was that all marked spawners recovered in 1960 had returned to their home hatchery or spawning areas nearby. These fish were released in various spots--some of them being trucked all the way to San Francisco Bay--so apparently their homing instincts were already formed when they were released at the age of four months.

Very few of the fish were large enough to be retained by commercial fishermen,

but sport anglers took numbers of them in the Pacific Ocean and the Sacramento River.



The young salmon were raised and marked at the U. S. Fish and Wildlife Service's Coleman Hatchery and released in four lots. One lot was placed in the river at Chico, another was trucked to Rio Vista and placed in the river there, still another lot was hauled to Rio Vista and transferred by live-bait boat to San Francisco Bay, and the fourth lot was trucked all the way to the bay. Similar marking and releasing was done in the spring of 1960 and the experiments will be continued in 1961.

Purpose of the experiment is to determine which part of the migration to the sea is the most hazardous for the young salmon.

Total percentage of recovery of the marked fish in 1960, both in the creel and on the spawning grounds, was greatest for the boated fish. Lowest recovery was of the fish released into the water at Rio Vista.

Department biologists believe these percentages of recovery will change from year to year.

Determination of the effects of downstream migration hazards must await completion of the experiment, but much valuable information is expected to be gleaned from year to year in the meanwhile.

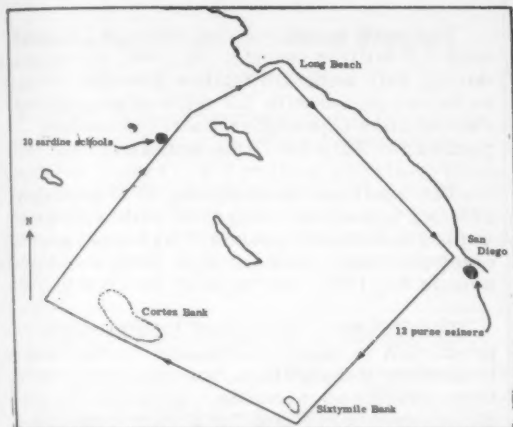
Note: Also see Commercial Fisheries Review, Dec. 1960 p. 25.

PELAGIC FISH POPULATION SURVEY CONTINUED:

Airplane Spotting Flight 60-27-Pelagic

Fish: The inshore area from Long Beach to San Diego and offshore to Sixtymile and Cortez Banks was surveyed from the air (December 16, 1960) by the California Department of Fish and Game Twin Beechcraft, to investigate persistent reports from the industry, fishermen and others of a large concentration of sardine schools outside the Channel Islands.

Weather conditions were fair throughout the flight and more than 300 miles of open ocean were scouted. No sardine schools were seen outside the Channel Islands, but 20 small to medium schools were seen 20 miles WSW. of the west end of Santa Catalina Island.



Airplane spotting flight 60-27 (Dec. 16, 1960).

About two miles off Mission Bay (San Diego) 12 purse seiners were observed setting on a small concentration of mixed Pacific mackerel and sardines.

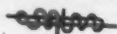
Note: Also see *Commercial Fisheries Review*, Feb. 1961 p. 14.



Cans--Shipments for Fishery Products, January-November 1960

Total shipments of metal cans during January-November 1960 amounted to 115,090 short tons of steel (based on the amount of steel consumed in the manufacture of cans) as compared with 109,049 tons in the same period of 1959. As of the end of November, the pack of California sardines was down sharply from the same period of 1959. Except for tuna canning, fish canning was at a seasonally low level in November.

Note: Statistics cover all commercial and captive plants known to be producing metal cans. Reported in base boxes of steel consumed in the manufacture of cans, the data for fishery products are converted to tons of steel by using the factor: 23.0 base boxes of steel equal one short ton of steel.



Central Pacific Fisheries Investigations

DRIFT BOTTLES USED TO STUDY PACIFIC OCEAN CURRENTS AROUND HAWAIIAN ISLANDS:

A study of the direction and speed of Pacific Ocean currents was initiated in January this year by the Honolulu Biological Laboratory of the U. S. Bureau of Commercial Fisheries. Plans call for the release of several thousand drift bottles each year. The drift bottles will be released by the Bureau's research vessel Charles H. Gilbert in groups of ten, four or more times each day while at sea.

The drift-bottle program is expected to provide information on the direction and the speed of ocean currents near the Islands. It is the first large-scale study of its kind to be attempted in mid-ocean. The results of the study will be a series of charts, showing the current patterns in the Hawaiian region at various times of the year. It is expected that such charts will be useful to the Honolulu Biological Laboratory scientists in the study of the distribution of fish eggs and larvae and the organisms which are the food of larger fish. At the same time, information on currents is expected to be of great value in search and rescue operations when ships and small boats are disabled near the islands and at the mercy of the currents. The charts should also be of use to industry in planning for waste disposal, to meteorologists in making weather forecasts, and to sport and commercial fishermen as well.

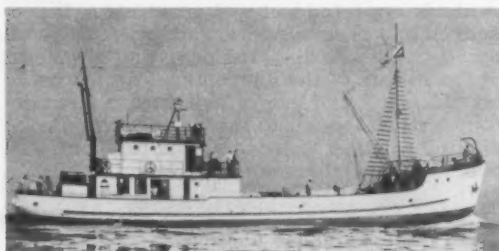
Cooperation is sought from anyone finding these bottles washed ashore on the beach. Each bottle will contain a numbered self-addressed post card, together with instructions for filling in the blank spaces on the post card with the information needed for the drift-bottle study. The back of the instruction card is printed with bright orange stripes to attract attention.

The bottles are made of clear glass, and contain the post card and instructions plus a small amount of sand as ballast. Anyone finding such a bottle or card is asked to fill in legibly the blank spaces on the post card with his name, the time, date and place where the bottle or card was found, and the finder's mailing address. The post card should then be detached from the instruction card and mailed. No postage is required when the cards are mailed within the United States.

In return, the finder will receive a chart showing the time and place where the bottle which he found was released. Everyone is requested to fill in and mail every card which he finds, since it is expected that only a very small percentage of the bottles which are released at sea will finally be washed ashore, and each card is thus of great value in the drift-bottle program.

LOWER HAWAIIAN TUNA LANDINGS IN 1960 BEAR OUT PREDICTIONS OF BIOLOGISTS:

In addition to the results of research conducted from the U. S. Bureau of Commercial Fisheries research vessel Charles H. Gilbert, data concerning the commercial catch of skipjack tuna in Hawaiian waters are made available to Bureau biologists by the Hawaii State Department of Fish and Game, a tuna-canning company, and the commercial fishermen. Such data are used to monitor fluctuations in availability of the skipjack in Hawaiian waters and for various research studies, particularly those concerned with inter-relationships between the skipjack and the environment. In addition to providing the



The Service's research vessel Charles H. Gilbert.

catch data, personnel of the cannery and the sampan fishermen cooperate by making fish and facilities available to the biologists for studies such as those of size frequencies, stages of maturation, stomach contents, and blood types. The following is a summary of the 1960 skipjack catch statistics and of the size distribution, the latter from fish measured at the cannery.

The total 1960 landings of skipjack tuna by the Hawaiian commercial fishermen was 7.3 million pounds, of which, 5.1 million pounds were landed during May-September (the "season"), and 2.2 million during the remainder of the year.

The prediction for 1960 landings, made in March 1960 was for a poorer than average year. The average landings for the past eleven years was 10.0 million pounds. The lowest total during this period was for 1957, 6.1 million pounds; the highest for 1954, nearly 14.0 million pounds.

The peak month, on the average, is July, with 1.9 million pounds. In 1960, the landings during July were 1.4 million pounds. This is to be compared with 3.7 million pounds for July of 1954 (the highest) and 0.9 million pounds for July 1957 (the lowest).

The catch per boat during 1960 averaged 365,000 pounds as compared with a 13-year average of 385,000 pounds. The lowest average catch per boat, 1948 through 1960, was 245,000 pounds for 1957; the highest, 591,000 in 1959.

The Honolulu Biological Laboratory's prediction is based on the late-winter change in surface temperature, the time of reversal from cooling to warming. Although the prediction has been valid for 3 years, and by hind-casting for 8 additional years, it is empirical and does not consider the biology of the skipjack which, each spring, enter Hawaiian waters. These variations in catch may arise from variations in year-class size or from variations in the availability of the fish to the fishery.

Information leading to estimates of year-class size is obtained through the study of the distribution of skipjack landed at the Honolulu cannery. On the average, there are two modes in the size distribution of the "season" fish, one at 4.1 pounds (45 centimeters) and one at 18.0 pounds (70 centimeters). In the off-season the modes are less distinct, with a dominant mode frequently at 11 pounds (60 centimeters). During May, June and September 1960, the dominant mode was at 7.0 pounds (53 centimeters); 23.6 pounds (76 centimeters) in July, and two pronounced modes in August, 7 pounds (53 centimeters) and 26 pounds (78 centimeters). The 1960 off-season skipjack were predominately 6-8 pounds (50 to 55 centimeters) and 22-pound (74 centimeters) fish during January through April and 10-pound (59 centimeters) fish during October through December.

Information on local availability of skipjack is being sought through investigation of the relationship between oceanography and skipjack movements and through at-

tempts to locate the source of season fish. Both of these problems will be investigated on three cruises of the M/V Charles H. Gilbert in 1961.



Federal Purchases of Fishery Products

DEPARTMENT OF DEFENSE PURCHASES, 1960:

Fresh and Frozen Fishery Products: For the use of the Armed Forces under the Department of Defense, 1.7 million pounds of fresh and frozen fishery products were purchased in December 1960 by the Military Subsistence Supply Agency. This was lower than the quantity purchased in November by 1.0 percent

Table 1 - Fresh and Frozen Fishery Products Purchased by Military Subsistence Supply Agency, December 1960 with Comparisons

QUANTITY				VALUE			
December 1960	1959	December 1960	Jan.-Dec. 1959	December 1960	1959	December 1960	Jan.-Dec. 1959
1,706	1,775	22,917	22,651	832	876	11,839	11,624

and under the amount purchased in December 1959 by 3.9 percent. The value of the purchases in December 1960 was lower by 7.3 percent as compared with November 1960 and 5.0 percent less than for December 1959.

During 1960 purchases totaled 22.9 million pounds (valued at \$11.8 million)--an increase of 1.2 percent in quantity and 1.8 percent in value as compared with 1959.

Prices paid for fresh and frozen fishery products by the Department of Defense in December 1960 averaged 48.8 cents a pound, about 3.1 cents less than the 51.9 cents paid in November 1960 and 0.6 cent less than the 49.4 cents paid during December 1959.

Canned Fishery Products: Canned fish purchases in December 1960 were light. As compared with the year 1959, total purchases of canned fish in 1960 were up 26.0 percent in quantity and 58.9 percent in value. In 1960 purchases of canned salmon were up 231.2 percent in quantity and 230.1 percent in value principally because the pack was larger. On the other hand purchases of canned tuna were down 2.4 percent in quantity, and 3.5 percent in value; canned

Table 2 - Canned Fishery Products Purchased by Military Subsistence Supply Agency, December 1960 with Comparisons

Product	QUANTITY				VALUE			
	December 1960	1959	December 1960	Jan.-Dec. 1959	December 1960	1959	December 1960	Jan.-Dec. 1959
Tuna	47	741	3,610	3,698	24	315	1,613	1,672
Salmon	-	-	3,593	1,085	-	-	2,436	737
Sardine	21	25	147	1,051	9	11	61	177

sardine purchases were down 86.0 percent in quantity and 65.5 percent in value.

Note: Armed Forces installations generally make some local purchases not included in the data given; actual total purchases are higher than indicated because local purchases are not obtainable.



Fisheries Loan Fund

LOANS APPROVED

OCTOBER 1 TO DECEMBER 31, 1960:

From the beginning of the Fisheries Loan Fund program in 1956 through December 31, 1960, a total of 848 applications for \$25,866,250 have been received. Of these, 459 (\$11,107,203) have been approved, 288 (\$8,024,014) have been declined or found ineligible, 71 (\$4,650,485) have been withdrawn by applicants before being processed, and 30 (\$913,785) are pending. Of the applications approved, 169 were approved for amounts less than applied for. The total reduction was \$1,170,763.

The following loans were approved during October, November, and December of 1960:

New England Area: Silas Barrows, Narragansett, R. I., \$21,200; Samuel S. Cottle, Jr., Wakefield, R. I., \$25,450; Clarence J. Santos, Provincetown, Mass., \$5,000; and John C. Sisson, Wakefield, R. I., \$13,950.

South Atlantic and Gulf Area: Felix C. Birch, Fort Myers, Fla., \$21,426; Evan J. Callais, Sabine, Texas, \$18,000; Thomas R. Thornton, Marathon, Fla., \$3,750; and George H. Wenzel, Bon Secour, Ala., \$15,000.

California: Caribe Fishing Co., Inc., San Diego, \$125,000 and Nick Mosich, et al, San Diego, 125,000.

Pacific Northwest Area: Ivar Angell, et al, Bellingham, Wash., \$25,000; William Brun, Port Angeles, Wash., \$5,830; John W.

and Julia A. Clausen, North Bend, Oreg., \$5,000; William F. O'Meara, Chinook, Wash., \$1,300; and Western Ace Company, Inc., Tacoma, Wash., \$80,000.

Alaska: Eugene Browning, Homer, \$4,500; Santiago M. Cesar, Juneau, \$8,500; Lynn Crosby, Elfin Cove, \$3,200; Clare Hiner; Sel-dovia, \$7,900; Charles McLeod, Juneau, \$5,000; Clarence Moy, Pelican, \$15,000; Jerry Nielsen, Wrangell, \$4,000; Margarete von Scheele, Kodiak, \$6,500; and Fred Torsen, Ouzinkie, \$4,800.



Freeze-Drying

EXPERIMENTS PLANNED:

Exploratory experiments on the freeze-drying of various types of fish products will be conducted by the Gloucester, Mass., Technology Laboratory of the U. S. Bureau of Commercial Fisheries. The Army Quartermaster Laboratory in Chicago has offered its freeze-drying equipment for these studies.

Organoleptic evaluation and determination of nutritive changes of the freeze-dried products will be carried on in conjunction with the Gloucester Laboratory's studies on irradiated fishery products. Some work in freeze-drying has been done by the Army Laboratory, but those studies were aimed at determining only what food products can be successfully freeze-dried.



Great Lakes Fisheries

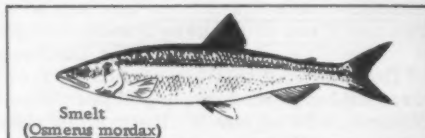
Exploration and Gear Research

SEASONAL DISTRIBUTION STUDIES OF COMMERCIAL FISH STOCKS IN LAKE ERIE CONTINUED:

M/V "Active" Cruises 13 and 14:

The U. S. Bureau of Commercial Fisheries exploratory fishing vessel Active conducted the fifth and sixth cruises in the 1960 series of otter-trawl explorations in United States waters of Lake Erie from Monroe, Mich., to Buffalo, N. Y. The two 16-day cruises—one in October and one in November—provided additional information on the seasonal abundance, distribution, and potential commercial production of smelt and other underutilized species by trawling.

During the October cruise, smelt were found to be concentrated at depths of 70 feet or more in certain parts of the eastern two-thirds of the lake. The two best catches, averaging 1,290 pounds per hour, were taken at a depth of 70-80 feet off Fairport, Ohio. Other catches averaging 650 or more pounds per hour were taken in 70-80 feet off Fairport and 90-100 feet off Erie, Pa., and Dunkirk, N. Y. Surface temperatures ranged from 64° to 71° F.



During the November cruise, smelt were found at shallower depths, but were caught in relatively insignificant amounts. Best fishing was obtained in 40-60 feet off Fairport, Ohio, where four drags caught smelt at rates of 210 to 330 and averaged 254 pounds per hour. Surface temperatures ranged from 43° to 52° F.

Catches of other species were insignificant during both cruises. With the exception of 31- and 33-pound catches of carp, 25- and 32-pound catches of minnows, and a 26-pound catch of yellow perch, all catches of other species amounted to 19 pounds or less per drag per species.

Note: Also see *Commercial Fisheries Review*, Dec. 1960 p. 32.



Great Lakes Fishery Investigations

LAKE ERIE FISH POPULATION SURVEY SUMMARIZED:

The U. S. Bureau of Commercial Fisheries biological research on Lake Erie for 1960 is summarized to demonstrate the type of inquiry made and to show the progress made. During the year, 645 10-minute trawl tows were made (108 hours total) in the western basin and most of the several hundred thousand fish captured were sorted and counted. Scales, lengths, and weights were taken from about 1,400 fish. About 75,000 fish were measured, and 5 percent of these fish were preserved for future examination. A total of 104 10-minute tows with fry nets were made to catch newly-hatched fish. Gill nets were set on three separate occasions to catch fish not ordinarily taken by trawl or tow nets.

Samples of important species of fish in the commercial landings were taken in the spring and fall. Scale samples were obtained from 4,092 and lengths and weights were measured on an additional 6,276 fish.

The limnological features of the waters of the western basin such as temperature, turbidity, pH, alkalinity, and oxygen content of the water were measured seasonally. Samples were taken of the plankton and bottom fauna for later study.

Yellow pike marketed from Lake Erie ports are sorted into size groups--each group usually commands a different price. Number 2's are less than 1½ pounds; Number 1's range



from 1½ to 4 pounds; and jumbos are larger than 4 pounds. Sorting practices are somewhat arbitrary and may vary between ports and fishermen but differences usually are not great. Records of the abundance of the size groups of yellow pike landed (Number 1's, 2's, and jumbos) and their ages provide a broad basis for determining production trends for the present and immediate future. They also make possible easier determination of changes in the abundance of year-classes.

The dominance of the larger and older yellow pike (jumbos) in the Lake Erie fishery may indicate that production of individuals, temporarily at least, is on the decrease, and conversely, the dominance of smaller and younger fish (Number 2's) may indicate that such production is on the increase. The 1960 spring production, near a record low, was dominated by catches of Jumbo yellow pike. Production this fall--greatly improved over last fall--was dominated by Number 2's. In 1960, the Number 2's consisted almost entirely of one-year-old fish (hatches in 1959); Number 1's usually were two- and three-year-old fish; and jumbos four years old and older.

In April and May 1960, 4,000 yearling yellow pike caught in trap nets by commercial fishermen at ten different locations between

Bono and Vermilion, Ohio, were tagged. The tagged fish averaged 10½ inches long; 2½ inches short of the legal minimum length in Ohio. A four-inch, yellow neoprene dart-type tube tag was inserted into the back of each fish, angling forward until its barb was anchored between the rays of the spiny dorsal fin.

By the end of 1960, 333 tags--8.3 percent of the total--had been returned. About 65 percent were recovered from United States waters and 35 percent from Canadian waters.

The localities of tag recovery give some indication of the movements of these young yellow pike during their second year of life. The 74 tags returned in April and May came from the same area in which they were tagged. By the first of June, the tagged yellow pike showed a tendency to move northward. In June most of the tags were recovered around Pelee Island and the Bass Islands. Most recaptures were made in this area during the remainder of the year.

Only two tagged fish were caught east of Lorain, Ohio. One was taken off of Cleveland while the other had moved to Dunkirk, N. Y.; over 180 miles in 172 days. One tagged fish was caught in southern Lake Huron, while 3 more were caught in Lake St. Clair. Nine other tagged yellow pike were captured near the mouth of the Detroit River. Only 3 recoveries came from the Toledo-Monroe area along the western shore.

The majority of the tagged yellow pike was caught in October. The percentages of returns per month are as follows: April - 11, May - 11, June - 2, July - 7, August - 9, September - 19, October - 32, November - 8, and December - 1.

United States fishermen caught most of the tagged fish during the first half of the fishing season, but as the season progressed, Canadian fishermen caught tagged yellow pike with increasing success due to their northerly movement.

Since the lengths of tagged and untagged fish caught were about equal, the tags apparently did not interfere with the growth of the fish. Many of the tagged yellow pike had sores around the tag insertion. Biologists found that in most instances the wound was superficial and was not causing the fish any great harm.

WESTERN LAKE SUPERIOR FISHERY SURVEY FOR 1960 COMPLETED:

M/V "Siscowet" Cruise 10: This cruise (November 30-December 20, 1960) brought to a close the season's activities in the western Lake Superior area with the U. S. Bureau of Commercial Fisheries research vessel Siscowet. Although vessel operation was seriously hampered by rough weather and icing, some important life-history data were collected for several species of fish in the Apostle Islands region.

The primary objectives were to follow the spawning activities of the various forms of chubs and to collect eggs from the ripe specimens. Short gangs of gill nets (2¼-inch mesh) were set in Pike's Bay, northwest of Madeline Island, south of Stockton Island, and southeast of Outer Island.

Most of the chubs were still green but enough ripe specimens were captured to obtain fertilized eggs from L. hoyi and L. kiyi. In addition, the crosses were made with female L. hoyi and male lake herring, and female lake herring and male L. hoyi. Through the cooperation of the Wisconsin Conservation Department the eggs will be incubated at the Bayfield Hatchery to the eyed stage when they will be transferred to the Northville, Mich., hatchery. At Northville they will be under constant observation and study in an attempt to discover characteristics which may aid in field identification of the various chubs.

The spawning activities of the round whitefish, pygmy whitefish, and lake herring were also studied during the cruise. On December 1 a gang of 3 gill nets (2½-inch mesh) was lifted just off the south shore of Madeline Island in 3½ fathoms. The catch consisted of 177 round whitefish (average weight about 1 pound), 38 lake herring, 12 longnose suckers, and 2 brown trout. About 90 percent of the round whitefish were spent or nearly spent. These fish had spawned on a gravel-rocky bottom at a water temperature of 40.0° F. Attempts to collect eggs off the bottom with a bottom sampler and a ½-meter larva net were unsuccessful. The rocky nature of the bottom undoubtedly prevented efficient operation of the devices.

The pygmy whitefish spawned during the last week of November. Specimens taken in the trawl on November 23 were still green. On December 2 all the pygmy whitefish taken in the trawl were spent. The fish were taken

at depths ranging from 20 to 30 fathoms over a bottom covered with decayed leaves and debris. There was no evidence that the pygmy whitefish migrated to shallow water to spawn. The water temperature during this period was about 40.0° F.

The lake herring were observed spawning on rocky reefs as early as November 21 (water temperature 42.0° F.) and ripe specimens were still observed at 85 fathoms on December 20 (water temperature 40.0° F.). The height of the spawning season occurred during the last week of November.

Surface water temperatures had cooled to about 36.0° F. by the end of the cruise.

Note: Also see Commercial Fisheries Review, Feb. 1961 p. 20.



Great Lakes Technological Research

BREADED CHUB FILLETS TESTED FOR CONSUMER ACCEPTANCE:

Several hundred pounds of chub were filleted and breaded under the supervision of the Great Lakes Technological Laboratory Staff of the U. S. Bureau of Commercial Fisheries for consumer acceptance tests. The breaded chub fillets were test fed at two industrial cafeterias in Detroit and were found to be generally satisfactory.

Tests will be continued on the keeping qualities of chub fillets prepared in various forms and frozen. At suitable intervals, organoleptic tests will be carried out to determine the changes in the fillets during cold storage.



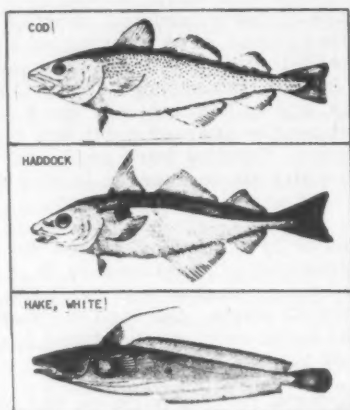
Groundfish

PRODUCTION COSTS STUDIED IN NEW ENGLAND AND CANADIAN INDUSTRY:

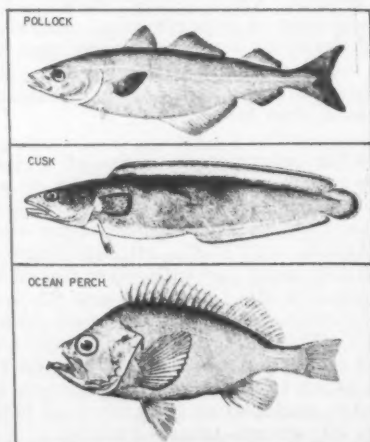
A study designed to identify and evaluate factors involved in the competitive position of the New England groundfish industry and its chief competitor, the Canadian groundfish industry, has been completed and is now being reviewed by Interior's Bureau of Commercial Fisheries.

The study was made by Boston College under a contract from the Bureau. The

study was motivated by the fact that in 1939 domestic producers supplied 91 percent of the United States market for groundfish fillets but in 1959 supplied only 33 percent of that market. Various biological and economic factors, including production costs, are considered as reasons for this change.



The report covers only the groundfish industry. Cod, haddock, hake, pollock, cusk and ocean perch were the specific species covered. Other segments of the New England fisheries--the Maine lobster and sardine, the scallop and the industrial fish industry producing fish meal, solubles, oil and other by-products--are not included.



Emphasis has been given to costs and earnings in fishing for groundfish. In addition

to the cost analysis, organizational structure of the respective industries, labor market conditions, the role of government, and other factors were considered. The study also reviews some of the economic principles involved in the catching operations of the domestic industry, including the principles involved in maximizing gross income from a fluctuating resource such as is involved in this industry.

Suggestions are given concerning a more rational approach to the fish catching operations of the domestic industry. In the report Boston College suggested diversifications in the catch objectives as a partial answer to the fishermen's problem. "It would lessen the danger of dependence on one species of fish," the report points out. "Whether and how this diversification could be accomplished will depend on a number of biological and economic factors," the authors say.

The New England groundfish industry has been beset with difficult problems. A substantial portion of these problems relate to the vessel operation stage. Partially because of the difficulties of this other group, the Fishery Loan Fund, operated by the Department, was established in 1956. Loans made to vessel operators in this industry have, to some extent, helped to ease their economic difficulties. In 1960 a fishing vessel construction differential subsidy was authorized by the Congress for a period of three years. This program is now being implemented. The Department is authorized to pay up to one-third of the cost of constructing a fishing vessel in the New England groundfish industry. Various kinds of research programs have also been initiated in attempts to improve fishing conditions and reduce costs of production. However, these programs are concerned with difficult problems, and solutions are not quickly and easily obtained.

Bureau economists are now reviewing and evaluating the report. The Bureau expects to publish the report during the spring of 1961. The study was financed by funds made available under the Saltonstall-Kennedy Act.

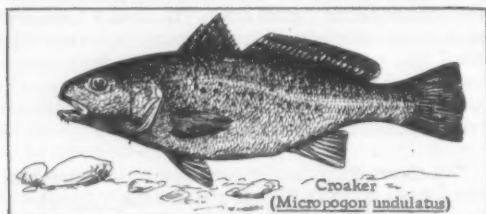


Gulf Fishery Investigations

Following are some of the highlights of the studies conducted by the Galveston, Tex.,

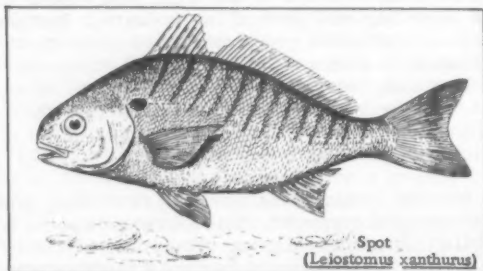
Biological Laboratory of the U. S. Bureau of Commercial Fisheries during October-December 1960:

INDUSTRIAL FISHERY STUDIES: Work was expanded to include 10 of the dominant species to be sampled on a systematic schedule. Croaker, spot, and spotted trout comprised 62 percent of the total landings by weight for October. In November 1960 they were 71 percent of the total landings and approximately 78 percent in December. Changes of species composition between this period in 1959 and 1960 were almost negligible. Miscellaneous species, those consisting of less



Croaker
(*Micropogon undulatus*)

than one percent each of the total weight, comprised 7 percent in October, 11 percent in November, and nearly 10 percent in December. Life-history studies showed croaker and spot spawning during the middle of the period and razorbelly spawning near the latter part of the period. Spot were spent by the last weeks of December, but a few croaker were still gravid. The average number of species in October was 15, 19 for November, and 15 for December.



Spot
(*Leiostomus xanthurus*)

No new species were noted during the period. New species have become increasingly rare during the past 6 months which indicates most of the species common to the bottom trawl fishery have been taken.

In October a total of 26 samples were taken from 787,789 pounds of fish landed; 27 samples in November from 945,350

pounds; and 25 samples were taken in December. Bad weather throughout the latter part of the period seriously curtailed fishing. Because of uncertain landings, no schedule of port sampling was possible. When weather conditions and landings stabilize, sampling will return to a regular schedule.

Because of fewer landings, most of the Gulf petfood plants were working on a reduced schedule during most of the quarter. During October, the average depth fished was 5 fathoms, and in November it was 6 fathoms. By December the average depth had increased to 8 fathoms. Catches were good, and fish were generally above average in size among the dominant species in particular.

The majority of the fleet fished the area from Mobile ship channel west to Horn Island gaining whatever shelter was available during high northerly winds. During December several of the large refrigerated boats began fishing west of the Mississippi Delta.

EFFECT OF PESTICIDES ON MARINE ORGANISMS: Routine bioassays of various chlorinated hydrocarbons were carried out during the quarter using spot (*Leiostomus xanthurus*); Atlantic croaker (*Micropogon undulatus*); sailfin molly (*Mollienisia latipinna*); gulf killifish (*Fundulus grandis*); sheepshead minnow (*Cyprinodont variegatus*); blue crab (*Callinectes sapidus*); and white shrimp (*Penaeus setiferus*). At this time of year the lower water temperatures afford little selection of experimental animals, and most of the bioassays were conducted on the sailfin molly and gulf killifish. The sailfin molly has been one of the most resistant species tested thus far.

Need for information on the effects of environmental factors on the toxicity of insecticides was clearly shown in experiments conducted at different temperatures with the gulf killifish. At 21° C., killifish exposed to dieldrin (70 parts per billion) suffered 30 percent mortality after 24 hours and 90 percent after 48 hours. At similar concentrations, but at 17° C., slightly smaller specimens suffered no loss after 24 hours and only 30 percent after 48 hours; slightly larger specimens also suffered no loss after 24 hours and only 20 percent after 48 hours.

Studies of the effects of sublethal levels of pesticides on the rate of hatching and the development and growth of young were initi-

ated. The preliminary work has consisted of developing suitable methods for handling experimental groups of brine shrimp eggs, pregnant live-bearers (sailfin molly), post-larval blue crabs, and post-larval shrimp.

SHRIMP FISHERY INVESTIGATIONS:

Pink Shrimp Migration, Growth, and Mortality: During November 1-4, 1960, 13,306 juvenile pink shrimp were marked with fast green stain and released near Bottle Key in northeast Florida Bay. On November 24-26, five were recovered in Florida Bay off Pigeeon Key which lies about $2\frac{1}{2}$ miles ESE. of the release site. Between November 27 and December 15, two more were recovered in the same area, and two were recovered near Crane Keys, about 5 miles SW. of Bottle Key. The latter recoveries indicate a tendency toward southwesterly movement for at least a portion of the experimental population.

From November 28 to December 15, 39,913 juvenile pink shrimp were marked with trypan blue stain and released in lower Pine Island Sound on Florida's west coast. The purpose of this experiment is to determine the northern limit of coastal nursery areas inhabited by immature shrimp of the Tortugas population. No recoveries were reported to date.

Of the 11,000 small pink shrimp that were graded, marked, and released on August 9 in Biscayne Bay, none have been recovered to date. One possible explanation of the lack of recoveries is that the stain used (trypan red) did not present enough contrast to the shrimp's normal color to permit ready identification by bait fishermen or dealers. The stain in all individuals comprising a sample held in captivity for 3 months was, however, still readily detectable at the end of that period.

The Florida State Board of Conservation has recently reported a second species of Penaeidae, *Penaeus braziliensis*, from Biscayne Bay. It was formerly believed that *P. duorarum* was the only penaeid occurring there. A check of several bait shrimp samples not only corroborated the discovery, but also revealed the presence of still another form which resembles *P. aztecus*. Since all three species are practically indistinguishable at all but the most advanced stages, the question arises as to what degree such a complex will invalidate the results of research on pink shrimp per se in the southeast Florida area.

Marking Techniques: Inability to extract mixed stains from shrimp tissue in quantities sufficient to permit their identification by chromatographic and spectrophotometric methods continues to be a major drawback. Pyridine has proved to be a satisfactory extractant in cases where shrimp retained "greater-than-normal" amounts of stain. But, unfortunately, "loaded" recoveries are the exception rather than the rule.

The hypothesis that some of the stain may combine chemically with shrimp tissue, and that extraction attempts thus far have succeeded in removing only the uncombined stain, is now being tested. The approach is to first destroy the tissue protein with various proteolytic agents and then, employing the pyridine and other methods, extract the stain from the residue. Preliminary experiments were disappointing as both protein and stain were destroyed during proteolysis.

Collection and organization of various shrimp measurement data continued. Computation of factors relating length to weight, carapace length to total length, "tail" weight to total weight, etc., is under way for the Gulf's four commercial species. Certain of these factors will aid the industry in standardizing processor-fisherman buying and selling practices, while all will provide biologists with means for converting research data (including fishery statistics) to comparable units.

Larvae Studies: Enumeration of penaeid shrimp larvae sorted from 3,111 plankton samples was completed. All specimens were coded according to kind and stage of development. Fifty-seven "types" have been defined and figured. These are now being studied in an effort to consolidate them by developmental series on a genus or species basis. A series representing each kind of larvae encountered will be retained for specific identification at a later date. Although the identity of several forms (esp. *Penaeus* spp.) is fairly certain, that of most will have to await comparative material reared from known parents.

Attempts to rear and describe early penaeid larvae of known parentage continued unsuccessful. Although eggs were obtained from several species held in the laboratory, none ever reached the hatching stage.

Several techniques for controlling the growth of microzoan populations in rearing

media were designed and tested. The method showing most promise in preliminary tests consists of a recirculating system in which small rearing aquaria are fed sea water (1) treated with penicillin and streptomycin, (2) filtered through fine sand, and (3) passed under ultra-violet light. Growth of populations of troublesome micro-predators in media so treated appeared to be markedly reduced over that observed in untreated media.

At present, identification of penaeid post larvae is possible only for specimens in the most advanced stages. To provide a means for identifying common species at most post-larval stages, early (unidentifiable) post larvae taken periodically from local waters are being reared--one per container--to sizes at which present keys permit identification. Comparison of cast exo-skeletons recovered after every molt is yielding information which may find use in constructing keys for penaeids in all but the earliest post-larval stages.

Bait Shrimp Production: Commercial bait shrimp production for October-November 1960 in the Galveston Bay area increased 66 percent over that for the same period in 1959 (170,800 pounds for 3,090 hours in 1960 vs. 102,700 pounds for 1,910 hours in 1959). Production continues to decline rapidly, however, as is typically the case during the late fall and winter months. Practically all bait fishermen in Upper Galveston, Trinity, and East Bays curtailed operations for the season.

Catch composition by species was 94-98 percent white and 6-2 percent brown shrimp for the period October-November 1960, contrasted to 92-99 percent white and 8-1 percent brown shrimp for the same period in 1959.



Maine Sardines

CANNED STOCKS, JANUARY 1, 1961:

Distributors' stocks of Maine sardines totaled 233,000 actual cases on January 1, 1961--2,000 cases (1 percent) less than the

235,000 cases on hand January 1, 1960. Stocks held by distributors on November 1, 1960, amounted to 277,000 cases, and on April 1, 1960, totaled 252,000 cases, according to estimates made by the U. S. Bureau of the Census.

Canners' stocks on January 1, 1961, totaled 1,029,000 standard cases (100 $\frac{3}{4}$ -oz. cans), an increase of 186,000 cases (26.0 percent) as compared with January 1, 1960. Stocks held by canners on November 1, 1960, amounted to 1,258,000 cases and on April 1, 1960, totaled 397,000 standard cases.

The 1960 pack (from the season which opened on April 15, 1960, and ended on December 1, 1960) was about 1,975,000 standard cases.

At the beginning of the 1960 packing season on April 15, 1960, the carryover in the hands of canners from the 1959 pack was 335,000 cases. This carryover plus the 1960 pack of 1,975,000 cases as of December 1, 1960 (the close of the season), made the available supply as of January 1, 1961, a total of 2,310,000 cases--more than the supply of 2,171,000 cases on January 1, 1960. Shipments have been slightly less than a year ago.

Stocks of canned Maine sardines in warehouses of multiunit organizations on January 1, 1961, totaled only 53,000 cases, only 1,000 cases more than on the same date in 1960, but substantially less than the 57,000 cases reported on January 1, 1959.

Note: Also see *Commercial Fisheries Review*, Jan. 1961 p. 28.



Markets for Fishery Products

In conducting a study of long-term economic prospects for the domestic fishing industry, which it will bring to completion soon, the U. S. Bureau of Commercial Fisheries has reviewed a mass of source materials concerned with general long-range economic forecasts. Two items recently reviewed effectively analyze the future economic setting in which industry, including the fishing in-

Table 1 - Canned Maine Sardines--Wholesale Distributors' and Canners' Stocks, January 1, 1961, With Comparisons 1/

Type	Unit	1960/61 Season		1959/60 Season				
		1/1/60	11/1/60	7/1/60	6/1/60	4/1/60	1/1/60	11/1/59
Distributors	1,000 actual cases	233	277	172	197	252	235	296
Canners	1,000 std. cases 2/	1,029	1,258	359	235	397	843	1,001

1/ Table represents marketing season from November 1-October 31.

2/ 100 $\frac{3}{4}$ -oz. cans equal one standard case.

dustry, must operate and find its future markets. One of the two items, a report on a recent symposium on world food and population growth conducted by the British Association for the Advancement of Science, has great significance for the fishing industry. The British Association gave prominence to the subject because of its view that in the absence of catastrophic events, world population will have doubled by the year 2000, while food production, left to itself, will soon be far below the necessary minimum for support of such a population. With only forty years to go to reach the year 2000, crash programs would appear essential. The consequence of a failure to rise to the challenge will be disaster for the advanced nations which cannot hope to hold their own against world pressures of overpopulation, famine, and diseases.

The second item is a book, authored by the staff of a domestic magazine under supervision of its chief economist, entitled Markets for the Sixties. It describes coming transformations in the American economy. Those in the fishing industry will find most interesting the detailed description of the consumer market of the sixties. It observes that there may come to pass an annual after-tax income of over \$7,500 for 45 percent of all United States families, and a college education will become nearly as routine as a high-school education is now. The consequence of the higher level of income and education is a more discerning population at the market place. There will be a demand for greater variety, better quality, the uncommon, and the striking in goods and services. Concerning the consumer of the sixties the study reports that "the most striking effect of the boom (of the last decade) has been to make the United States a remarkably young nation and this in itself is a sharp reversal of historical experience. High proportions of children have almost invariably marked societies rural or only semi-industrial in character; the advanced nations of the Western world have been generally characterized by declining birth and death rates, both of which tend to increase the average age of the population."

The latter publication, in particular, should prove helpful to those concerned with the fishing industry. By bringing into view the anticipated economic environment of the 1960's, it provides some basis for judging future marketing conditions for the industry. As an example, the anticipated higher family in-

comes, and demand for variety and quality of products, would indicate the advisability of the industry redoubling its efforts to bring out new high-quality convenience products which would find a ready market under these conditions.



Maryland

GEAR STUDIES PROVE THAT NYLON GILL NETS CATCH MORE SHAD:

Nylon anchor gill nets catch twice as many East Coast shad per yard as do linen anchor gill nets, according to a report published by the Maryland Department of Research and Education.

The biologist, who conducted the study in Maryland reports that buck or male shad caught in nylon gill nets are heavier than those caught in linen gill nets. This is due to the fact that nylon has a greater elasticity than linen. In addition, nylon has several advantages to the fisherman in that it is stronger than linen and is more resistant to rot, fouling organisms, and sunlight deterioration. Nylon has become so widely accepted due to its more favorable physical properties that it now takes a special order to obtain linen netting.

The experiments confirm the impressions of commercial fishermen who have felt that nylon nets were producing more favorable catches of shad.



North Atlantic Herring Research

DOGFISH USED FOR SEROLOGICAL STUDIES ON HERRING:

As part of herring population studies being conducted by scientists at the U. S. Bureau of Commercial Fisheries, Biological Laboratory at Boothbay Harbor, Me., antisera have been prepared by injecting herring blood cells into dogfish held in experimental tanks. Tests during December 1960 indicate that dogfish are capable of recognizing individual differences in herring that rabbit antisera failed to distinguish. On this basis, dogfish may prove to be very useful in serological work on herring.

NEW DIRECTOR APPOINTED FOR BOOTHBAY HARBOR BIOLOGICAL LABORATORY:

A new director of the U. S. Bureau of Commercial Fisheries Biological Laboratory in Boothbay Harbor, Me., has been appointed to succeed Leslie W. Scattergood, who has been transferred to the Bureau's Washington Office to the post of Associate Chief of the Branch of Reports. The Bureau has selected Bernard Skud, formerly Assistant Director of the Bureau's Galveston Biological Laboratory, to succeed Scattergood.

A native of Ironwood, Mich., Skud received a B. S. degree in Zoology in 1949 from the



Bernard E. Skud

University of Michigan and an M. S. degree in Zoology in 1950. Working out of the Bureau's Seattle Laboratory, Skud was associated with the Pink Salmon Research Program. For several years as Chief of the Alaska Herring Investigation, he studied herring fishery problems of the Pacific until he was placed in charge in 1956 of the Passamaquoddy Bay Power Survey fishery studies where he became familiar with Maine's sardine industry.

In its planning for the future, the U. S. Bureau of Commercial Fisheries considers its Biological Laboratory at Boothbay Harbor to be ideally located to play an important part in not only future studies of species commercially important to Maine, but as part of the over-all National emphasis on various oceanographic programs relating to the fisheries.

The Laboratory's plans for the immediate future include herring research, especially studies of early life history, populations, movements, herring serology and diseases, and a new study of the productivity of Maine's coastal waters.

Shellfish research will continue as before with the soft-clam program, concentrating

on the completion of culture and management studies, and initiation of studies on the effects of the environmental factors on clams. A new program to study diseases of shellfish was also initiated at the Laboratory this winter.



Oregon

EARLY RETURNS INDICATE ESTABLISHMENT OF SILVER SALMON RUN:

The appearance of silver salmon jacks or males on the Mary's River near Corvallis recently spurred hopes for the success of the Oregon's Fish Commission efforts to establish a run of silver salmon on that Willamette tributary as well as in other Oregon streams not now supporting a silver salmon run.



Silver Salmon (*Oncorhynchus kisutch*).

The jacks, male salmon maturing and returning from their ocean sojourn before most other fish of the same year's stock, were concentrated below a diversion dam on the Mary's River near Corvallis. Because of improper passage facilities at the structure, the fish were unable to move on upstream. A Game Commission biologist dip-netted 30 jacks from the pool below the dam and transferred them to waters above the obstruction. So far as known this is the first record of the appearance of mature silver salmon in the Mary's River.

The jacks almost certainly represent the first returns from the Fish Commission's May 1959 releases involving 80,000 fingerlings, according to the biologist in charge of the Willamette River studies for the Commission's Federally-financed Columbia River Fishery Development program. The young salmon were distributed to various locations in the Mary's River drainage, including sites on Nichols, Hawley, Rainbow, Hammer, and Cherry Creeks. The main body of mature fish from this release should return to the Mary's River system during the fall of 1961.



Plankton

COLLECTED BY SUBMARINE IN ARCTIC OCEAN:

For the first time a United States submarine has been used to collect samples of plankton under polar ice. The nuclear submarine *Seadragon* took the samples during its voyage from Portsmouth, N. H., to Pearl Harbor, Hawaii, by way of the Northwest Passage and the North Pole.

The collecting was done by an automatic sampler, somewhat resembling an automatic soft drink dispenser, that was devised and built for the voyage. A biologist of the Woods Hole (Mass.) Biological Laboratory of the U. S. Bureau of Commercial Fisheries was one of the four scientists who collaborated in working out the design of the sampler.



Tuna

NEW ENGLAND BLUEFIN LANDINGS, 1960:

During the New England June-November 1960 tuna-fishing season, almost 1.2 million pounds (valued at \$65,000) of bluefin tuna were landed. Although some catches were landed in June and November, close to 96 percent of the seasonal landings were made in the July-September period. Due, in part, to the lack of interest on the part of the canneries in supplies of New England-caught tuna, the average seasonal price was only about 5.5 cents a pound (about \$110 a short ton).

More than 50 percent of the June-November landings were made by the small Provincetown purse-seiner *Silver Mink* during the months of August and September. Most of the balance was taken by the Provincetown, Mass., traps with smaller quantities landed at Gloucester, Mass., and Maine ports.

Table 1 - New England Landings of Bluefin Tuna,
June-November 1960

Month	Quantity Lbs.	Value \$	Average Price \$/lb.
June	20,945	3,578	17.00
July	220,738	10,909	4.94
August	619,076	32,684	5.28
September 1/	290,000	15,892	5.48
October 1/	20,000	1,096	5.48
November 1/	6,000	900	15.00
Total	1,176,759	65,059	5.53

1/Partly estimated.

The *Silver Mink*, a small tuna purse-seiner vessel of Provincetown, Mass., completed its third consecutive season of bluefin tuna (*Thunnus thynnus*) fishing on September 11, 1960.

Table 2 - Landings of Bluefin Tuna by New England Purse-Seiner
Silver Mink, 1960

Date of Landing	No. of Fish	Weight (lbs.)
August 15	40	5,240
16	23	3,360
20	417	63,670
23	242	34,970
26	700	102,230
27	699	102,730
29	665	102,190
September 2	470	70,680
3	154	22,330
6	915	130,240
7	35	3,545
11	260	35,450
Totals	4,620	676,635

Table 3 - Bluefin Tuna Purse-Seining by *Silver Mink* Off
New England Coast, 1958-60

	1960	1959	1958
Pounds	676,600	1,514,800	359,000
Length of Season	4 weeks	7½ weeks	10 weeks
Number of Trips	9	21	1/
Number of Fish	4,620	11,577	1/
Average Weight of Fish	146.5 lbs.	130.8 lbs.	1/

1/Unavailable.

The short 4-week fishing season that began on August 15, 1960, for the vessel resulted in a catch of 676,600 pounds of bluefin tuna in nine trips made in or near Cape Cod Bay. This amount was 838,200 pounds, or 55.3 percent, less than the 1959 catch. However, the catch per unit of effort was the same in both years. The weak market for bluefin tuna on the East Coast was largely responsible for the shorter fishing season, and the full potential of this seasonal fishery could not be realized.

Note: Also see *Commercial Fisheries Review*, February 1959
p. 1 and May 1960 p. 27



United States Fishing Fleet^{1/} Additions

DECEMBER 1960:

A total of 16 vessels of 5 net tons and over were issued first documents as fishing craft during December 1960--an increase of 2 vessels as compared with the same month of 1959. The Gulf area led with 5 vessels, followed by the Pacific area with 4 vessels.

Fishing craft issued first documents during 1960 totaled 408 vessels--a decrease of 1/Includes both commercial and sport fishing craft.

Table 1 - U. S. Vessels Issued First Documents as Fishing Craft By Tonnage, December 1960

Net Tons	Number
5 to 9	7
10 to 19	3
20 to 29	1
30 to 39	2
40 to 49	3
Total	16

with 135 vessels in 1959.

71 vessels compared with 1959. Most of the decrease occurred in the Gulf area where only 85 vessels were issued first documents in 1960 compared

Table 2 - U. S. Vessels Issued First Documents As Fishing Craft By Areas, December 1960

Area	December		Total			
	1960	1959	1960	1959	1958	1957
	(Number)					
New England	2	-	34	15	13	19
Middle Atlantic	-	-	13	12	13	23
Chesapeake	2	6	76	106	99	104
South Atlantic	1	2	45	76	135	130
Gulf	5	4	85	135	270	166
Pacific	4	2	114	97	112	102
Great Lakes	1	-	17	6	10	8
Alaska	1	-	24	32	31	48
Puerto Rico	-	-	-	-	-	1
Virgin Islands	-	-	-	-	1	-
Total	16	14	408	479	684	601

Note: Vessels assigned to the various areas on the basis of their home ports.

Table 3 - U. S. Vessels Issued First Documents As Fishing Craft, 1938 to 1960 Inclusive

Year	Number	Year	Number	Year	Number
1938	376	1946	1,085	1954	717
1939	357	1947	1,300	1955	418
1940	320	1948	1,184	1956	521
1941	354	1949	1,002	1957	601
1942	358	1950	812	1958	684
1943	358	1951	780	1959	479
1944	635	1952	675	1960	408
1945	741	1953	729		



U. S. Foreign Trade

EDIBLE FISHERY PRODUCTS, NOVEMBER 1960:

Imports of edible fresh, frozen and processed fish and shellfish into the United States during November 1960 decreased by 9.9 percent in quantity and 10.5 percent in value as compared with October 1960. The decrease was due primarily to lower imports of ground fish fillets (down 1.8 million pounds), frozen albacore and other tuna (down 3.8 million pounds), and fresh and frozen salmon (down 2.8 million pounds), and to a lesser degree, a decrease in the imports of frozen shrimp. The decrease was partly offset by moderate increases in the imports of canned sardines in oil and canned tuna in brine.

Compared with November 1959, the imports in November 1960 were up by 1.0 percent in quantity but lower by 0.4 percent in value. Higher imports of frozen albacore and other tuna (up 5.0 million pounds) and frozen shrimp (up 3.2 million pounds) were partially offset by a drop of about 2.8 million pounds in the imports of canned tuna in brine and fresh and frozen salmon (down 3.6 million pounds).

United States Imports and Exports of Edible Fishery Products, November 1960 with Comparisons

Item	QUANTITY			VALUE		
	Nov. Year			Nov. Year		
	1960	1959	1959	1960	1959	1959
	(Millions of Lbs.)			(Millions of \$)		
Imports:						
Fish & shellfish:						
Fresh, frozen, & processed 1/	87.8	86.9	1,070.5	26.4	26.5	309.6
Exports:						
Fish & shellfish:						
Processed only 1/ (excluding fresh & frozen)	5.0	9.6	68.0	2.3	4.5	22.8

1/Includes pastes, sauces, clam chowder and juice, and other specialties.

United States exports of processed fish and shellfish in November 1960 were lower by 19.4 percent in quantity and 17.9 percent in value as compared with October 1960. Compared with the same month in 1959, the exports in November 1960 were down 48.1 percent in quantity and 48.9 percent in value. The lower exports in November 1960 as compared with the same month in 1959 were due primarily to sharply lower exports of California canned sardines and canned salmon.

IMPORTS OF CANNED TUNA IN BRINE UNDER QUOTA:

The quantity of tuna canned in brine which could be imported into the United States during the calendar year 1960 at the 12½-percent rate of duty was 53,448,330 pounds. Any imports in excess of the quota were dutiable at 25 percent ad valorem.

Imports during 1960 amounted to 50,266,025 pounds, according to data compiled by the Bureau of Customs--3,182,305 pounds less than the quota established for that year. In 1959 the quota of 52,372,574 pounds was reached early in December and total imports for that year exceeded the quota by about 2,932,000 pounds.



U. S. Production of Fish Sticks and Portions, 1960

The United States production of fish portions in 1960 amounted to 48.3 million pounds valued at \$17.2 million and the production of fish sticks totaled 65.0 million pounds with a value of \$28.7 million. Compared with the previous year, fish portions were 11.1 million pounds (30 percent) greater in quantity and \$4.0 million (31 percent) greater in value. Fish sticks production was up 4.8 million pounds (8 percent) in quantity and \$68,000 in value.



During 1960, 8.3 million pounds of breaded cooked and 37.9 million pounds of breaded raw portions were processed—96 percent of the 1960 total. Unbreaded portions accounted for the remaining 2.1 million pounds or 4 percent.

Table 1 - U. S. Production of Fish Sticks
by Months and Type, 1960 1/

Month	Cooked	Uncooked	Total
	(1,000 Lbs.)		
January	5,190	313	5,503
February	6,174	360	6,534
March	7,252	584	7,836
April	4,484	378	4,862
May	3,422	276	3,698
June	4,081	279	4,360
July	3,319	363	3,682
August	4,582	421	5,003
September	4,886	529	5,415
October	6,069	484	6,553
November	5,841	429	6,270
December	5,031	290	5,321
Total Quantity 1960 . .	60,331	4,706	65,037
	(\$1,000)		
Total Value 1960 . . .	27,002	1,715	28,717
Total Value 1959 . . .	26,768	1,881	28,649

1/Preliminary data.

The 1960 fish-stick production consisted of 60.3 million pounds of cooked fish sticks or 93 percent of the fish stick total. The remaining 4.7 million pounds or 7 percent was made up of raw fish sticks.

Table 2 - U. S. Production of Fish Sticks, 1956-1960

Month	1960 1/	1959	1958	1957	1956
	(1,000 Lbs.)				
January	5,503	6,265	5,471	4,261	4,862
February	6,534	6,340	5,925	5,246	5,323
March	7,836	5,594	5,526	5,147	6,082
April	4,862	4,708	4,855	4,492	3,771
May	3,698	4,398	4,229	3,380	3,873
June	4,360	4,575	4,702	3,522	3,580
July	3,682	3,783	4,574	3,821	3,153
August	5,003	3,872	4,358	4,643	4,166
September	5,415	5,343	5,328	4,861	4,085
October	6,553	5,831	5,485	5,162	5,063
November	6,270	4,822	5,091	4,579	4,585
December	5,321	4,739	5,467	4,014	4,019
Total	65,037	60,265	61,011	53,128	52,562

1/Preliminary data.

The Atlantic Coast States led all other areas in the production of both fish portions and fish sticks with 27.9 and 53.1 million pounds, respectively. The inland and Gulf

Table 3 - U. S. Production of Fish Sticks
by Areas, 1959-1960 1/

Area	1960 1/		1959	
	No. of Firms	1,000 Lbs.	No. of Firms	1,000 Lbs.
Atlantic Coast States . . .	23	53,154	25	50,448
Interior and Gulf States . .	8	6,161	5	5,412
Pacific Coast States . . .	8	5,722	10	4,405
Total	39	65,037	40	60,265

1/Preliminary data.

Table 4 - U. S. Production of Fish Portions,
by Months, 1960 1/

Month	Breaded			Unbreaded	Total
	Cooked	Uncooked	Total		
	(1,000 Lbs.)				
January	463	3,022	3,485	118	3,603
February	546	2,768	3,314	119	3,433
March	870	3,567	4,437	156	4,593
April	696	2,532	3,228	169	3,397
May	522	2,542	3,064	105	3,169
June	288	3,472	3,760	160	3,920
July	511	3,328	3,839	179	4,018
August	561	2,804	3,365	128	3,493
September	964	3,301	4,265	276	4,541
October	1,111	3,816	4,927	220	5,147
November	831	3,547	4,378	260	4,638
December	945	3,224	4,169	157	4,326
Total					
Quantity 1960	8,308	37,923	46,231	2,047	48,278
	(\$1,000)				
Total:					
Value 1960	3,663	12,585	16,248	905	17,153
Value 1959	2,541	9,555	12,096	1,042	13,138

1/Preliminary data.

Table 5 - U. S. Production of Fish Portions
by Areas, 1959-1960

Area	1960 1/		1959 2/	
	No. of Firms	1,000 Lbs.	No. of Firms	1,000 Lbs.
Atlantic Coast States . .	23	27,925	25	19,793
Interior and Gulf States .	11	19,184	10	16,676
Pacific Coast States . .	5	1,169	4	678
Total	39	48,278	39	37,147

1/Preliminary data.

2/Revised.

Table 6 - U. S. Production of Fish Portions
by Months, 1958-1960

Month	1960 ^{1/}	1959 ^{2/}	1958
		(1,000 Lbs.)	
January	3,603	2,692	1,973
February	3,433	3,025	1,254
March	4,593	3,225	1,471
April	3,397	2,634	2,268
May	3,169	2,634	1,478
June	3,920	3,247	1,504
July	4,018	2,227	2,161
August	3,493	2,796	1,516
September	4,541	3,558	1,566
October	5,147	4,314	2,560
November	4,638	3,483	1,979
December	4,326	3,262	2,060
Total	48,278	37,147	21,790
^{1/} Preliminary data.			
^{2/} Revised.			

States were next with 19.2 million pounds of fish portions and 6.2 million pounds of fish sticks. The Pacific Coast States made up the remaining 1.2 million pounds of fish portions and 5.7 million pounds of fish sticks.

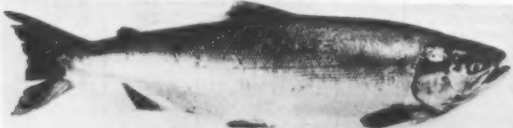
Note: Also see Commercial Fisheries Review, March 1960 p. 33.



Washington

EXPERIMENT WILL TRY TO CREATE A NEW RUN OF SOCKEYE SALMON TO THE NORTH FORK OF THE LEWIS RIVER:

Efforts to create a new run of sockeye salmon in the North Fork of the Lewis River will be inaugurated this spring, the Director of the Washington State Department of Fisheries announced on January 24, 1961. He stated that one million juvenile sockeye would be planted in Merwin Reservoir on the Lewis in southwestern Washington.



Sockeye Salmon (*Oncorhynchus nerka*).

The eggs utilized in this effort to initiate a new run of this fine food fish in the lower Columbia River tributary were transported from streams in the Lake Washington watershed near Seattle and from the Cultus Lake watershed in British Columbia.

Transported from their native areas to the Speelyai incubation station in the "eyed" stage, these eggs will complete their hatching at this site and will be released into the 3,000 acres of Merwin Reservoir where they will live and grow for one year prior to their migration to sea.

Studies by the Washington Fisheries Agency show that excellent growth can be obtained in that reservoir. Environmental conditions there are similar to those sockeye salmon require during their normal one year of lake residency in their natural habitat.

Also involved in the project is a cooperative effort by the State's Department of Fisheries, the Pacific Power and Light Company, and the Cowlitz County Public Utilities Department to test artificial devices that have been developed to liberate the seaward migrants from the reservoir.

If the transplanted salmon sockeye adapt to their new home and leave the reservoir for the sea at the normal time, the returning adults will be trapped at the Pacific Power and Light Merwin dam powerhouse in the fall of 1964. Their eggs would be incubated in the Speelyai hatchery and the cycle would be completed.

* * * * *

SALMON "FISH FARMING" EXPERIMENTS BEGIN TO PAY OFF:

The program of "fish farming" for salmon by Washington State's Department of Fisheries, initiated in 1957, is beginning to pay off, according to a January 24, 1961, news release by that Department. Returns to the "farms" at the end of 1960 proves that the new salmon-rearing system will work.

Returns at six selected spots, where returning adult salmon were counted, and in some instances trapped for egg-taking by Department crews, indicate that the initial phase of testing and experimenting is nearing an end. Coming years should show substantial contributions from the program to commercial and sports fisheries, along with enough returns for egg-taking for future seeding if necessary.

Checks for marked salmon catches in 1960 showed that a total of 243 silver salmon marked and reared in Lake Melbourne were caught in the commercial troll fishery at Neah Bay, Westport, and the Columbia River. In addition, 1,100 of the 1957 brood, reared in Lake Melbourne, returned to Eagle Creek, lake outlet, to spawn. Using usual catch-to-escapement ratios, fishery scientists estimate that the Melbourne fish farm contributed 2,860 silver salmon to the 1960 salmon fisheries of the Pacific Coast.

Salmon from the fish farms, in the Department's original over-all rearing program, were seen as additions to the harvest of salmon, designed for catching rather than for egg-taking. However, fish were taken at some of the counting stations when it became clear they would not be caught. More than 3 million eggs, chiefly silvers, were taken and will be hatched and reared in the Department's hatcheries.

The Fisheries Director states: "We have completed our first step. We still have things to learn about the proper care and protection of young salmon in the farms to boost the survival rate, but returns are considered remarkable by fisheries biologists in view of the poor fishing during the 1960 season."

Fish farming of pond fish is a centuries-old practice in some middle European countries and in the Orient. The method has never been used extensively, however, in the rearing of salmon.

Other returns to fish farms checked this fall and winter are as follows:

Erdman Lake, Mason County, 176 silver salmon were trapped, with a take of 219,000 eggs.

Cranberry Lake, Mason County, a total of 1,672 silver salmon were trapped, with egg take of 2,299,835.

Capitol Lake, Olympia, in addition to the 10,273 adult chinook salmon returning to the trap at Fishway No. 3 on the Deschutes River above the Lake, 711 silver salmon were counted at the trap, with many others proceeding upstream to spawn; 321 were trapped for the purpose of taking 156,000 eggs.

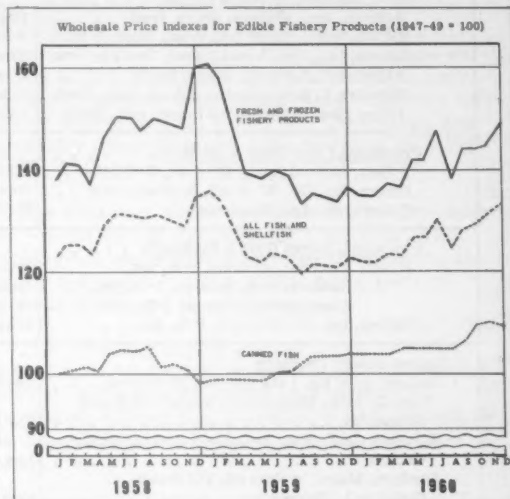
Titlow Ponds, Tacoma, 124 adult silver salmon were captured near and inside the salt-water lagoon, with 50,000 eggs taken. This is only a portion of the fish observed.

Pleasant Lake, Clallam County. Returns of silver salmon at this lake, used as a rearing area jointly with the Game Department, totaled 2,243, of which 1,677 were jacks; 870,000 eggs were taken from a portion of the 566 mature adults.



Wholesale Prices, January 1961

The January 1961 wholesale price index for edible fishery products (fresh, frozen, and canned) at 130.9 percent of the 1947-49 average was down 1.7 percent from the preceding month, but was up 7.4 percent from the same month of 1960. The decrease from December last year to January this year was due primarily to an increase in the haddock supply at Boston following some better weather on the fishing grounds. In January this year prices for most of the fishery products that make up the wholesale price index were higher than in the same month of 1960.



The drawn, dressed, and whole finfish subgroup index in January 1961 was down 6.3 percent as compared with the preceding month. Lower fresh drawn haddock prices (down 29.7 percent) at Boston and lesser declines for fresh-water whitefish more than offset higher prices for fresh yellow pike. From December 1960 to January this year there was no change in frozen dressed halibut and salmon prices. From January 1960 to this January the subgroup index rose 9.4 percent due to higher wholesale prices for dressed king salmon (up 17.6 percent) at New York City and fresh drawn whitefish (up 12.4 percent) at Chicago. The increases were partially offset by slightly lower prices for fresh drawn haddock and frozen dressed halibut, plus a more substantial decrease for fresh yellow pike.

From December 1960 to January this year the fresh processed fish and shellfish subgroup index was about unchanged (down 0.5 percent). A rather sharp drop (24.3 percent) in the fresh haddock fillet prices at Boston was about cancelled out by the increase in the fresh shrimp prices at New York City. Fresh shucked oyster prices have remained stable the past few months. However, the wholesale price index for the subgroup this January was up 7.5 percent from January a year ago. Higher wholesale prices for fresh shrimp (up 11.2 percent) and fresh shucked oysters (up 7.2 percent) were more than sufficient to balance out a drop of 10.3 percent in the fresh haddock fillet price.

Changes from December 1960 to January 1961 in wholesale prices for frozen processed fish and shellfish items were slight. Increases of about one cent a pound for frozen haddock fillets and frozen shrimp were responsible for the 0.9 percent rise in the subgroup price index from December 1960 to January 1961. As compared with January a year ago, the January 1961 subgroup price index rose by 7.5 percent. All the subgroup items were priced higher in January this year as compared with January a year ago.

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, January 1961 with Comparisons

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, January 1961 with Comparisons								
Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices ^{1/}		Indexes (1947-49 = 100)			
			Jan. 1961	Dec. 1960	Jan. 1961	Dec. 1960	Nov. 1960	Jan. 1960
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					130.9	133.2	131.5	121.9
Fresh & Frozen Fishery Products:					146.2	150.0	146.9	135.1
Drawn, Dressed, or Whole Finfish:					162.7	173.6	165.4	148.7
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.12	.18	126.2	178.0	132.6	127.4
Halibut, West., 20/30 lbs., drsd., fresh or froz.	New York	lb.	.30	.30	92.8	92.8	92.3	93.8
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.90	.90	202.2	202.2	202.2	171.9
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.73	.75	179.8	185.9	185.9	159.9
Whitefish, L. Erie pound or gill net, rnd., fresh	New York	lb.	.63	.75	126.4	151.7	141.6	161.9
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.65	.50	152.4	117.3	164.1	166.5
Processed, Fresh (Fish & Shellfish):					146.0	146.8	141.7	135.8
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.39	.52	132.7	175.2	139.5	148.0
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	.75	.73	118.5	114.5	109.8	106.6
Oysters, shucked, standards	Norfolk	gal.	7.50	7.50	185.6	185.6	185.6	173.2
Processed, Frozen (Fish & Shellfish):					116.0	115.0	119.6	107.9
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.39	.39	102.1	102.1	103.4	98.1
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.35	.34	109.9	106.7	106.7	97.3
Ocean perch, skins on, 1-lb. pkg.	Boston	lb.	.30	.30	118.8	118.8	118.8	108.8
Shrimp, lge. (26-30 count), 5-lb. pkg.	Chicago	lb.	.70	.69	107.2	106.5	114.2	100.3
Canned Fishery Products:					109.9	109.8	110.1	103.8
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	27.50	27.50	143.5	143.5	143.5	127.8
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	11.00	11.00	79.3	79.3	80.0	77.9
Sardines, Calif., tom. pack, No. 1 oval (15 oz.), 48 cans/cs.	Los Angeles	cs.	7.75	7.65	91.0	89.8	89.8	93.9
Sardines, Maine, keyless oil, 1/4 drawn (3-3/4 oz.), 100 cans/cs.	New York	cs.	8.50	8.50	90.5	90.5	90.5	93.1

^{1/}Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.

^{1/}Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.

Canned fish prices in January 1961 remained unchanged from the preceding month except for a 10-cent-per-case increase for California sardines. Supplies of this product are practically exhausted. But January 1961 canned fish prices were up 5.9 percent from the same month of 1961. Canned pink salmon prices rose 12.3 percent and canned tuna prices rose 1.8 percent. These increases were par-

tially offset by slightly lower prices for canned Maine and California sardines. Among the canned fish products, tuna was the only product being produced in volume in January this year. Although the demand was good, promotional efforts to further increase the sales of canned tuna continued through January.



PRINTERS' INK FROM FISH

Pakistani fish technologists have produced printers' ink of good quality by mixing Puntis fish oil with linseed oil. Puntis, *Barbus stigma* (Puntius), is a fish which is abundantly available at a low price. Shark-liver oil is also used in the manufacture of black printers' ink. (Australian Fisheries Newsletter, February 1959.)



FOREIGN

International

FOOD AND AGRICULTURE ORGANIZATION

GOVERNMENTS AND INDUSTRY SEEK GREATER MARKETS FOR FISH MEAL:

The rapidly rising production of fish meal and the drastic fall in fish-meal prices were examined at an international meeting on fish meal, March 20-29, 1961, at the headquarters of the Food and Agriculture Organization (FAO) in Rome.

Convened by FAO by request of governments and with the backing of the fish-meal industry, the meeting considered practical steps towards increasing effective demand for fish meal and ensuring stable conditions in the market.

The world's productive capacity for fish-meal has risen rapidly during the last few years, from about 1.2 million metric tons in 1954 to 1.9 million metric tons in 1959.

Peru, with a fish-meal production of only 16,500 tons in 1954, had increased her production 20 times by 1959, ranking second to the United States as a producer with 332,400 metric tons. In the same period, neighboring Chile quadrupled her production; other important producing countries, such as Denmark, Iceland, the Union of South Africa, and the U. S. S. R doubled their production, and the United States raised hers by nearly one-fourth.

In the last two years the utilization of fish meal has not kept pace with expanding production. As a result, stocks have accumulated and during 1960 production had to be reduced in a number of countries. Prices have fallen from about \$130 a ton to \$75 a ton and the incomes of fishermen and producers have seriously declined.

This situation has caused deep concern among both producers and interested gov-

ernments and prompted the request to FAO to sponsor the meeting. Invitations were extended to FAO member governments to send representatives, accompanied by industry advisers and technical experts. Technical and scientific experts were also present as part of the FAO secretariat.

The meeting assessed both the short- and long-term world demand for fish meal and considered ways and means of increasing the use of the product by action on the part of governments and the industry.

The meeting hoped to find ways to stabilize conditions in the international fish-meal market without resorting to restrictive measures during the transitory period before the hoped-for increase in demand can take place.

INTERNATIONAL PACIFIC SALMON FISHERIES COMMISSION

SOCKEYE AND PINK SALMON FISHERIES REGULATIONS IN CONVENTION WATERS FOR 1961:

The tentative suggestions for regulatory control of the 1961 sockeye and pink salmon fishery in North Pacific Convention waters as submitted to the fishing industry on December 16, 1960, were discussed and reconsidered in view of suggestions submitted by the Advisory Committee at a meeting of the Commission held in Vancouver, B. C., on January 20, 1961. Action taken by the Commission in modifying the original proposals is detailed as follows:

Canadian Convention Waters:

1. Subject to the 1961 sockeye run equaling or exceeding a run of the order totaling 5,500,000 fish, the Commission agreed to consider the possibility of increasing fishing time at appropriate intervals during the run provided that the fishing effort was at such a level to warrant such consideration.

International (Contd.):

2. In view of the briefness of the prescribed fishing period in Area 20 and because no agreement could be reached between gear in regard to the weekly starting time, the commencement of gill-net fishing in this area was delayed until Monday evening. The delay in the weekly start of gill-net fishing in Area 20 will allow the Commission the minimum time required to consider regulatory changes for each weekly period before gill-net fishing is normally terminated and generally will deter the movement of boats to the Fraser River for an extra day of fishing.

3. Agreement was reached that the prescribed one-day weekly fishing period from August 20 to September 2 in Area 20 will be taken under consideration on the basis of the indicated abundance of the pink salmon run at the time.

4. The dates for relinquishment by the Commission of regulatory controls in all Canadian Convention waters will be reconsidered at appropriate times during the course of the season.

5. The use of spring salmon nets was provided for in District No. I under the authorization of the Area Director of Fisheries during the month of September.

United States Convention Waters:

1. In view of the briefness of the prescribed fishing period during a major part of August and the lack of agreement of the gear in regard to the weekly starting time, the Commission reversed the normal pattern of starting time permitting the gill-net fishery to start first for the first part of the season ending August 5 and the purse seines and reef nets to start the fishing week first after that date. The change in procedure will allow the Commission the minimum time required to consider regulatory changes for each of the short fishing weeks before gill-net fishing is normally terminated.

2. Except for the seasonal opening and terminating dates of fishing in Juan de Fuca Strait, all fishing regulations applicable to this area were made to coincide with those effective in the inside Convention waters of the United States.



United States salmon troller fishing in Clarence Strait off Alaska.

3. The closure of all waters westerly of East Point Roberts from September 3 to September 23 to prevent the taking of "blowback" pink salmon was modified on the basis of further study to be effective only for the period September 3 to September 9. The easterly boundary of the closure for the period September 10 to September 24 was moved westerly to the Iwerson Dock-Active Pass line.

General:

A 48-hour weekly closure on commercial trolling by both United States and Canadian fishermen was recommended for the waters of Juan de Fuca Strait lying westerly of the William Head-Angeles Point line and easterly of the Bonilla-Tatoosh line. The restriction was not recommended for the high seas area of Convention waters pending a detailed study to determine the most practical means of providing for the requirements of the conservation of pink salmon where they are subject to a troll fishery.

Appropriate test fishing will be conducted by the Commission throughout the fishing season as a necessary check on the suitability of the current regulatory restrictions and of the escapement.

Note: See Commercial Fisheries Review, March 1960 p. 38.

TUNA

AFRICAN CONFERENCE HELD IN DAKAR:

A tuna biologists' conference, sponsored by the Commission for Technical Cooperation in Africa South of the Sahara, was held the latter part of 1960 at Dakar, Senegal, West Africa. It was attended by delegates from Cameroun, Dahomey, France, Guinea,

International (Contd.):

Liberia, Portugal, Somalia, United Kingdom, and the Union of South Africa and by observers from Nigeria, Senegal, United States, and the Food and Agriculture Organization of the United Nations. The attention of the conference was centered on summarizing existing knowledge of tunas in the seas around Africa. There was full recognition of the need for thorough scientific study of the tuna resources of the area in order to build a basis for evaluating the effect of a growing fishery on the populations of tuna.

According to the United States observer, little is known at present of the size of the tuna stocks of the Atlantic, but the physical and biological conditions off the African west coast are generally similar to those in the major American Pacific tuna fishing grounds off the west coast of Central and South America, and there appears to be a very strong probability that the new Atlantic fishing grounds can support a large-scale production on a continuing basis.

AFRICAN OCEANOGRAPHY AND
MARINE FISHERIES CONVENTION

Specialists representing research institutes on the west coast of Africa in the field of sea fisheries and oceanography, convened in Monrovia, Liberia, from December 5-10, 1960, to study proposals for implementing regional coordination and cooperation in oceanography and marine fisheries. The meeting was held under the auspices of the Scientific Council for Africa.

The following governments were represented by observers: Cameroun, Republic of Congo, France, Guinea, Liberia, and Ghana.

Proposals were made by these specialists for a joint action program between research institutes and government departments concerned with research on the west coast of Africa. One or more oceanographic surveys are planned. An oceanographic and fishing expedition in the Gulf of Guinea has been proposed. Organizations outside Africa have expressed an interest in providing assistance. The representative of FAO said organizations would be willing to assist in locating and recruiting additional qualified scientists and technicians as member governments could not supply more than one-third the scientists and technicians required.

The International Cooperation Administration previously indicated an interest in providing financial assistance.

The following problems of regional coordination and cooperation were discussed:

- (1) Zoological Systematics (Identification Problems).
- (2) Biology of Useful Species.
- (3) Physical Oceanography (Hydrology).
- (4) The Lack of General Equipment.
- (5) Technology of Fishing.
- (6) Technology and Marketing of Fish.

Among the recommendations drafted at the end of the meeting were the following:

- (1) A list of major species of commercial value in West African waters with sketches for identification.
- (2) A working group to make a more thorough study of the genus Sardinella.
- (3) The need to train African research workers in the field of marine science.
- (4) Governments in Africa, south of the Sahara, to consider ways and means of improving statistical services.
- (5) The publication of pamphlets to follow the future evolution of fisheries.
- (6) Studies in respect to certain groups of crustaceans and molluscs.
- (7) A study of the problem of beetle damage to fish products.
- (8) The study of fish species.
- (9) The preparation and distribution of a bibliography of oceanography and marine biology. (International Cooperation Administration report from Monrovia, December 22, 1960.)



Algeria

SHRIMP INDUSTRY:

The Algerian shrimp industry, along with the rest of the fishing industry in Algeria, is characterized by outmoded techniques and equipment, and a "traditional" spirit among most of the fishermen. The largest shrimp grounds are located near the ports of Algiers, Nemours, and Oran. According to a recent study by a semiofficial organization, there are only a few small plants where shrimp are processed; the processing consists of preparing the shrimp for export under refrigeration.

Official statistics provide data only on the combined catch of shrimp ("crevettes grises"), prawns ("grosses crevettes," "bouquets" or "crevettes rouges"), and crayfish or spiny lobster ("langoustes"). Annual landings (heads-on) of these crustaceans have been rather stable in recent years, averaging about 1,500 metric tons per year. Shrimp caught by individual fishermen in small boats are not included in the official data. Landings in 1959 of 1,014 tons of "crevettes" were below the 1956-58 average.

Data on the breakdown of vessels by type of fishing are not available. For the entire Algerian coastal shipping fleet, official statistics list a total number of 882 boats, a combined tonnage of 6,545 tons, manned by 4,505 men. It is believed that practically all of the local fishing fleet is French-owned and that there is no United States investment in the industry.

All shrimp exports in recent years have been listed as "crevettes--autres," which presumably means prawns ("crevettes rouges") or a similar type of crustacean. There were no exports of common shrimp ("crevettes grises") during the 1956-59 period. The average export price for the "crevettes--autres" rose from 5,777 NF (new francs) or US\$1,651 per metric ton in 1956 to 6,658 NF (about US\$1,359) per metric ton in 1959.

Year	Imports ^{1/}			Exports ^{2/}		
	Quantity	Value		Quantity	Value	
	Metric Ton	1,000 N.F.	US\$ 1,000	Metric Ton	1,000 N.F.	US\$ 1,000
1959 . . .	1.6	17.0	3.5	95.4	635.6	129.7
1958 . . .	2.1	14.9	3.5	293.6	1,888.4	449.6
1957 . . .	10.3	31.7	8.6	368.2	2,126.3	578.6
1956 . . .	35.9	46.0	13.1	464.0	2,584.4	738.4

^{1/}Imports were all from France and Morocco.

^{2/}Exports to countries other than France were less than 1 ton.

There are no controls nor taxes on the export of shrimp. Exports have declined probably because of a growth of the internal market at the same time that the quantity of landings have remained stable.

A crew member of a shrimp boat received about 300 to 400 NF (US\$61-82) per month in 1959. The total "value added" (gross income less material and equipment expenses) by the entire fishing industry of Algeria in 1959 was only 25 million NF (about US\$5.1 million). The total value of all shrimp, prawns, and crayfish landed in 1958 was about 4.8 million NF (about \$1.15 million).

Table 1 - Algerian Landings of Shrimp, Prawns, and Spiny Lobster by Ports, 1956-59

Table 1 - Algerian Landings of Shrimp, Prawns, and Spiny Lobster by Ports, 1956-59								
Port of Landing:	Quantity							
	1959		1958		1957		1956	
	(Metric Tons)							
Algiers	385		500		539		563	
Oran	208		293		327		609	
Nemours	241		384		284		-	
Bone	113		202		254		181	
Philippeville	46		51		74		108	
Bougie	38		21		60		-	
Total	1,031		1,451		1,538		1,461	
	Value							
	US\$1,000		1,000 N.F.		US\$1,000		1,000 N.F.	
	US\$1,000	1,000 N.F.	US\$1,000	1,000 N.F.	US\$1,000	1,000 N.F.	US\$1,000	1,000 N.F.
Algiers	306	1,499	393	1,650	344	1,266	427	1,496
Oran	155	758	212	890	226	830	468	1,638
Nemours	249	1,222	345	1,450	242	888	-	-
Bone	80	393	143	600	194	713	151	529
Philippeville	20	99	26	110	46	168	-	-
Bougie	44	214	24	100	45	167	98	343
Total	1,854	14,182	1,143	4,800	1,097	4,032	1,144	4,006
1/Includes 17 metric tons of spiny lobsters valued at 203,000 NF. (US\$42,000).								

^{1/}Includes 17 metric tons of spiny lobsters valued at 203,000 NF. (US\$42,000).

Algeria (Contd.):

The study mentioned on the previous page states that there is only a limited amount of shrimp available at the depths that are presently being fished (up to 114 fathoms). It also estimates, however, that there are good possibilities for expansion of the catch if the fishermen will modernize their equipment and trawl in waters from 114 to 365 fathoms in depth where the shrimp are reported to be numerous. In recent years the government has studied the problems of the fishing industry and has made general plans for modernizing it and increasing production. As of the present date, however, little has been done to carry out this program. (United States Consulate, Algiers, December 29, 1960.)

Note: NF or "new" francs, new unit of currency adopted as of January 1, 1960, equals 100 "old" francs. Official conversion rates are: 3.5 NF or 350 "old" equals US\$1 1951-Sept. 1957; 4.2 NF or 420 "old" equals US\$1 Sept. 1957-Dec. 1958; 4.9 NF or 490 "old" equals US\$1 Jan. 1959 to date.

**Angola****FISH MEAL AND OIL PRICES,
DECEMBER 16-31, 1960:**

Beginning in October 1960, the Fishing Institute of Angola established minimum f.o.b. export prices for fish meal and oil. These minimum prices are set fortnightly by the Institute. The following prices were set for the second half of December 1960: Fish Meal: Type 1 (from fully mechanized plants), 2.14 escudos a kilo or about US\$67.87 a short ton; and Type 2 (sun dried), 1.80 escudos a kilo or about US\$57.08 a short ton. Fish Oil (based on acidity): 3° and lower, 3.20 escudos per kilo (5.074 U. S. cents a pound); 3° to 5°, 2.80 escudos per kilo (4.44 cents a pound); 5° to 10°, 2.30 escudos per kilo (3.647 cents a pound); 10° to 20°, 1.80 escudos per kilo (2.854 cents a pound); and 20° and over 1.40 escudos per kilo (2.22 cents a pound).

A subsidy has been granted to Angolan fish-meal producers for their exports since July 1, 1960: \$15 per metric ton has been given for mechanically-dried fish meal, and \$10 per ton for sun-dried. The subsidy has applied to exports from July 1, 1960, to December 31, 1960. Just what is to be done regarding the subsidy in 1961 has not been

decided. (United States Consulate, Luanda, January 9, 1961.)

**Belgium****FISH-MEAL PRICES, JANUARY 1961:**

Belgium fish-meal prices early in January 1961 were as follows: Imported Meal: 65 percent protein, US\$77.35 per metric ton or about \$70.15 a short ton, c. & f. Antwerp (80-90 percent digestible). Domestic Whole



Meal (fish solubles added): 70 percent protein, \$112.00 a metric ton or about \$101.61 a short ton f.o.b. plant (93-94 percent digestible). Domestic Regular Meal: 50-55 percent protein, \$69.50-76.45 a metric ton or about \$63.05-69.36 a short ton f.o.b. plant (about 90 percent digestible). (United States Consulate, Antwerp, January 5, 1961.)

**Brazil****SHRIMP INDUSTRY:**

A modern shrimp processing plant is located in Belem, Brazil, using a quick freezer and a grader.

In the city of Rio Grande, ten firms are active in the shrimp industry; two additional firms freeze and process shrimp in brine and engage in general fish preserving. The

Brazil (Contd.):

and engage in general fish preserving. The lack of freezing facilities, refrigerated warehouse space, and obsolete installations have kept Brazil's production low and costs very high.

Brazilian shrimp fishermen earn approximately 10,000 cruzeiros (US\$49) a month plus food. Masters of fishing vessels earn US\$500 a month.

The possibility of expanding the total annual catch of shrimp is good; brown and pink shrimp are exported to all countries, including the United States, but most production is consumed locally. With modern equipment and increased freezing capacity, exports could be increased. In 1960, a total of 100 metric tons were exported. (United States Embassy, Rio de Janeiro, December 16, 1960.)

Note: (1) Also see Commercial Fisheries Review, Feb. 1961, p. 38.

(2) Values converted at rate of 204 cruzeiros equal US\$1.

* * * * *

TUNA FISHING BY BRAZILIAN VESSEL:

On December 20, 1960, the first tuna caught by a Brazilian vessel was landed in Santos. The catch totaled 30 tons of fish of various kinds, including 23 tons of tuna. Hitherto, all tuna sold in Santos and Sao Paulo had been caught by a Japanese fishery company which operates a fleet of modern fishing vessels from that port.

The Brazilian vessel, the Joana Hora, is 10 or 12 years old, and was recently purchased at auction by an individual associated with a Santos fishery cooperative. The vessel was out 20 days fishing south of Cabo Frio, State of Rio de Janeiro, where tuna can be found in large quantities during the summer season. The crew consisted of the captain, two Japanese technicians, and 16 men.

According to reports, due to lack of refrigerating facilities aboard the Joana Hora, the vessel's catch was spoiled by the time the boat docked at Santos. Because he cannot afford to outfit his vessel with a refrigerating compartment, the owner will give up fishing for tuna and will limit activities to fishing expeditions of not more than 5 or 6 days to catch other species of fish close to the Sao Paulo State coast.

According to reports, the failure of Brazilians to develop commercial deep-sea fishing because of lack of funds may move the Sao Paulo State Government to set up a program for financing the purchase of modern vessels and gear by Brazilian fishermen. Such a program has been under consideration for some time but no practical measures have been taken so far. (United States Consulate, Sao Paulo, Brazil, December 30, 1960.)



Canada

BRITISH COLUMBIA FISH-MEAL INDUSTRY TRENDS:

The British Columbia herring fishery resumed operations on November 20, 1960, following an 11-months tie-up of the fishing vessels over a dispute between the fishermen and the reduction plants concerning ex-vessel prices.

About 90 percent of British Columbia's fish-meal production is exported, and the United States is its principal market. When herring fishing resumed in November 1960, export prices were about C\$1.45 a protein unit (C\$104.40 a short ton) f.o.b. Vancouver. Two weeks later prices had dropped to C\$1.40 a protein unit (C\$100.80 a short ton), and as of December 15, 1960, the price was down to C\$1.35 a protein unit (C\$97.20 a short ton). Prices are based on fish meal of 72 percent protein.

Sources in Vancouver report that British Columbia herring meal is preferred in the United States because of its better grind, color, and protein content. However, the same source claims that Peruvian competition has been successful in forcing lower prices. The British Columbia herring meal export prices about mid-1959 were C\$2.10 a protein unit (C\$151.20 a short ton) and as of December 1959, the export price was about C\$1.70 a protein unit (C\$122.40 a short ton).

The herring fish-meal reduction plants agreement with the fishermen, which resulted in fishing being resumed late in 1960, is subject to cancellation if economic conditions force prices down to an unprofitable level. (United States Consulate in Vancouver, December 15, 1960.)

Note: C\$1 equal to US\$0.9825.

* * * * *

Canada (Contd.):

BRITISH COLUMBIA SHUCKED OYSTER PRODUCTION, 1960:

The British Columbia shucked oyster production in 1960 was substantially lower than in 1959, but significantly higher than in 1958 when 62,834 Imperial gallons were purchased. Prices to producers for shucked stock in December 1960 were as follows for Imperial measures: half-pints, C\$0.30-0.60; pints, \$0.60-0.75; quarts, \$1.00-1.65; gallons, \$3.00-5.25. In December 1959 the price for gallons was \$4.00-5.25.

British Columbia Oyster Meats Production, 1959-60		
Imperial Measures	1960	1959
Half pints	377,363	386,713
Pints	18,569	13,576
Quarts	24,990	24,965
Gallons	43,712	56,827
Total in Imperial Gallons	78,395	92,741

Retail prices in Vancouver on January 16, 1961, were C\$0.55 for an Imperial half-pint container, compared to \$0.52-0.55 on January 15, 1960.

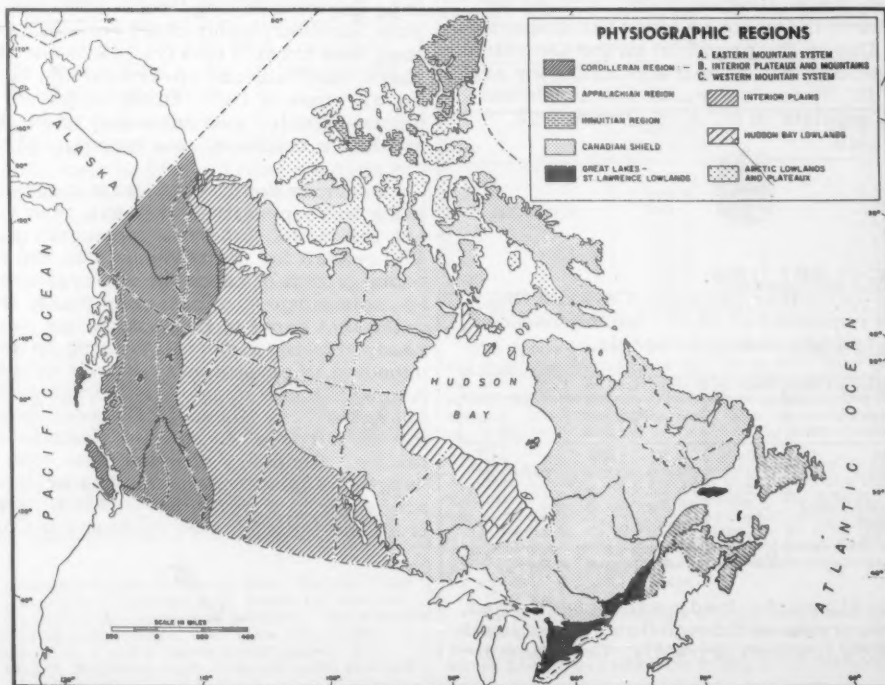
Note: See Commercial Fisheries Review, April 1960 p. 39.

CONFERENCE ON NATURAL RESOURCES SCHEDULED FOR OCTOBER 1961:

A conference on "Resources for Tomorrow" has been planned by Canadian Government experts, to be held in Montreal in October 1961. This will be the first major Government-sponsored resources conference held in Canada since 1906. The eleven major Canadian governmental units are sponsoring the conference.

Planning for the Conference went ahead another step as members of the Policy Subcommittee met in Ottawa on December 12-13, 1960. The Conference will study ways and means of making better use of Canada's resources of agricultural land, forests, fisheries, wildlife, and water. Recreational use of resources will be an important topic at the Conference.

About 80 background papers are being prepared at the present time, outlining various resource use problems facing Canadians. Leading resources experts from across the nation are preparing the papers. It is expected that 500 or more resource specialists will attend the Conference, including most of



Canada (Contd.):

the country's natural resource department Ministers, representatives of many national and regional organizations, representatives of universities, business, and industry.

Canada's method of approaching these and many other problems, through the "Resources for Tomorrow Conference," is being watched with interest by other nations with similar problems. Secretary to the Conference mentioned that several resources specialists of the United States government wished to attend as observers, as did officials of "Resources for the Future," a continuing body sponsored by a private United States foundation. Individuals of several other countries have asked for information, the United States Embassy in Ottawa reported on December 19, 1960.

NEW BRUNSWICK FISH MEAL PRICES, JANUARY 1-15, 1961:

Fish meal prices (60 percent protein) quoted by three of the largest New Brunswick, Canada, dealers early in January this year were C\$72-75 a short ton (C\$1.20-1.25 a protein unit), f.o.b. shipping point. Prices for export were the same as prices to domestic users. Due to the premium on the Canadian dollar, prices in United States currency are about US\$1.50 more per short ton. (United States Consulate in St. John, January 12, 1961.)



Ceylon

FISHING FLEET, 1959:

As of December 31, 1959, Ceylon's fishing fleet consisted of 16,552 nonmechanized vessels and 539 powered vessels.

Ceylon's Fishing Fleet as of December 31, 1959			
Nonmechanized Vessels		Powered Vessels	
Type	No.	Type	No.
Orus and kullas . . .	7,215	New mechanized vessels	415
Vallams	2,611	Mechanized orus	25
Teppams, catamarans	4,936	Mechanized vallams . .	
Parus, flat-bottomed boats and others . .	1,790	and padavus	99
Total	16,552	Total	539

Of the 415 mechanized vessels constructed, 334 were purchased through Government loans and 81 were financed privately. Government-

financed vessels constructed as of October 1960 numbered about 500 at an expenditure of approximately Rs.8.5 million (about US\$1.8 million), the purchase price of an average vessel and gear being Rs.17,500 (about US\$3,700). If present plans are carried out, construction in 1960-61 will be increased to 800 boats with a similar number in 1961-62, making a total of 2,110 boats, all under three tons.



In 1955 the Food and Agriculture installed two motors on Ceylon craft. This experiment proved successful and since then additional vessels have been motorized.

Information on the type of fishing engaged in by Ceylon's fishing fleets is limited. As a rule, however, mechanized vessels use tuna long lines to catch tuna (yellowfin and big-eyed), shark, sailfish, and spearfish; and drift nets for all types of fish. Orus, teppams, vallams, catamarans (or kuttumarams) catch Spanish and horse mackerel, barracuda, and bonito.

A former decision to grant mechanization loans to cooperatives only has been reversed and individual fishermen are again eligible. The reason for the reversal was the mushroom growth of cooperatives organized for the sole purpose of obtaining loans. It was noted that some of these societies were already showing signs of breaking up and were expected to cease functioning as cooperatives. Among the new cooperatives organized during 1959, the first 101 societies were organized for the purpose of obtaining loans for mechanization. Recovery of loans from both individuals and registered groups has been poor, according to a December 7, 1960, dispatch from the United States Embassy in Colombo.



Chile

FISH MEAL EXPORTS AND PRICES:

Chile's exports of fish meal for 1960 amounted to 26,433 metric tons valued at US\$1,990,690. The average export value per metric ton was about US\$75.31 (\$68.32 a short ton). The Export Division of the Central Bank reports November-December 1960 prices f.o.b. as follows: United States, US\$68.84 a metric ton (\$62.45 short ton); Germany, \$68.71 a metric ton (\$62.33 a short ton); Belgium, \$67.37 a metric ton (\$61.12 a short ton); and Netherlands, \$65.96 a metric ton (\$59.84 a short ton).

Only firms located in Arica and Iquique, which are subsidized, are now selling in the international market as the export price is below production costs. On six shipments of anchovy fish meal made from Arica on December 22, three shipments to the Netherlands of 200 metric tons sold at \$63 a metric ton (\$57.15 a short ton), while three shipments to the United States of 650 metric tons ranged from \$61-64 a metric ton (\$55.34-58.06 a short ton). Protein content of Chilean fish meal runs 64-72 percent.

Fish meal sells locally at about \$100 a metric ton (\$90.72 a short ton) at plant; \$110-120 a metric ton (\$99.79-108.86 a short ton) delivered at farm. This price is maintained by a "gentlemen's agreement."

Production of fish meal was 30,673 metric tons in 1959 and was expected to exceed 40,000 metric tons in 1960. Local consumption is estimated at 8,000-9,000 metric tons annually. (United States Embassy in Santiago, January 16, 1961.)

SHRIMP AND "LANGOSTINO"
INDUSTRY, 1960:

The entire shrimp industry of Chile, centered near Valparaiso, utilizes the small cold-water deep-sea shrimp, known as "camaron." It is found off the coast of the Provinces of Valparaiso and Aconcagua from Los Vilos to El Quisco.

Trawling for shrimp began in 1953. All are landed heads-on. There were five plants processing frozen shrimp in December 1960. Three plants, two of which are of the five that process frozen shrimp, can a limited amount of shrimp in brine.

Processing frozen shrimp is done by hand. Shrimp which average 120 count are cooked heads on. Heads are then removed, and the shrimp are peeled and deveined. Waste equals 70 to 80 percent of landed weight. For home use, frozen block packages of 12, 8, and 4 ounces are prepared. The shrimp are packed, jumble or layer, in small metal pans and

placed on trays for freezing. Both blast freezing and air freezing are used. The frozen blocks are reglazed, sealed in plastic bags, and packed for shipment in cartons of approximately 20 pounds. The 2- and 5-pound jumble packs are used by institutions. To assure good frozen shrimp in the center of the larger packages, the shrimp are first frozen individually, then reglazed, jumble packed in plastic bags, and placed in shipping cartons of approximately 20 pounds. These cartons are returned to the cold room for the final slow freeze. Monthly shipments are made by most packers. Canned shrimp are sold primarily in interior markets; none are exported.

Since hand labor is not cheap, one plant is considering installing a small peeling machine manufactured in Germany. Four plants now engaged in fish canning will process frozen cooked shrimp and lobster soon.

Also found in Chilean waters is the "plate lobster" or crawfish known as the "langostino." It is caught off the coast from Coquimbo to San Antonio, and should not be confused with the large white tropical shrimp also called "langostino" but which is not caught in any quantity or exported. The Chilean "langostino" is sold in the United States as "baby rock lobster type." It is not a true rock lobster nor a shrimp.

The "plate lobster" or "langostino" is processed by the same plants as shrimp. It is landed heads-on and cooked, peeled and deveined in the same manner as shrimp. Waste equals 90-95 percent of its landed weight. The heads-off count is 80-120 a pound. They are frozen, jumble pack, in 8- and 12-ounce block packages for retail sale and in 2- and 5-pound plastic bags for institutional use. More plate lobster is canned than shrimp. Until 1960 the plate lobster predominated in the frozen shellfish industry.

Chilean shrimp or "camaron" (*Phynchocinetes typus*) are captured at a depth of 100 fathoms or more by trawlers. The heads-off count averages 100-150 a pound (heads on). They are taken the year-around, with best trawling from May to December. Landings from December-April include small undeveloped young shrimp.

Table 1 - Chile's Landings of Shrimp and "Plate Lobster" or "Langostinos"

Year	Shrimp (Heads-on)	"Langostinos" (Heads-on)
 (Metric Tons)	
1960 1/	1,800.0	6,860.0
1960 Jan.-Apr. 2/	687.0	2,285.7
1959	882.0	5,814.0
1958	382.0	12,829.0
1957	128.8	11,383.8
1956	115.0	5,705.9

1/Estimate.

2/Actual landings.

The "plate lobster" or "langostino" (*Munida gregaris* and *Gulatheus monodon*) is also taken with otter trawls but at depths of 50 to 100 fathoms. The season is from May to December. The same fleet fishes either shrimp or "langostinos" in the Valparaiso zone. The "langostinos," however, are found farther to the north and to the south than the shrimp.

Chile's commercial fishing fleet consists of 38 trawlers and 47 purse seiners. Of these only 16 trawlers are engaged in fishing for shrimp and "langostinos." The smaller trawlers are 44 to 60 feet in length and are equipped with 100-170 hp. Diesel engines; the larger trawlers are 65 to 85 feet in length and have 250-300 hp. Diesel engines. All use otter trawls. Most of Chile's commercial fishing boats may be used either as trawlers or purse seiners.

The shrimp fleet consists of plant-owned and independent trawlers, mostly Chilean-owned. Processing plants have at least one vessel chartered. A Japanese- and a German-owned fleet of trawlers were fishing in the Valparaiso-San

Chile (Contd.):

Antonio areas as of December 1960 and may be catching shrimp as well as hake for fish-meal plants.

Construction and maintenance facilities for small fishing boats are limited. Boat building in the south of Chile has been restricted to small single units. Some large boats of 80-100 ton holding capacity are constructed in the Valdivia area destined primarily for use in northern zones for industrial fishing. These boats equipped to fish cost approximately Chilean escudos 60,000-70,000 (US\$56,980-66,476)--approximately the same as foreign-constructed vessels. The first modern boat yard for construction of fishing boats to be established in Chile will be at Iruque; production is expected by mid-1961.

The increase in trawlers fishing for shrimp will be influenced primarily by the supply and price of "langostino." Shrimp are found in colder water and at a greater depth, but in a smaller area. Trawlers are equipped to fish either shrimp or "langostino." Four more plants are expected to process shrimp and "langostino," therefore, trawlers now fishing for hake may transfer to shrimp and "langostino" if the price of fish meal should decline.

Chile's shrimp exports are cooked and frozen. The small 4-, 8-, and 12-ounce bar packages for home consumption presently are selling at US\$0.85 per pound f.o.b. Valparaiso. Frozen "langostinos" sell at approximately the same price as shrimp. During 1959 shrimp sold f.o.b. Valparaiso for US\$0.60-1.20 per pound. The commercial or institutional pack is believed to be less than 25 percent of total exports.

Table 2 - Chile's Exports of Shrimp and "Langostinos," 1957-59.

Year	Shrimp		"Langostinos"	
	Quantity	Value	Quantity	Value
	Lbs.	US\$	Lbs.	US\$
1959	192,263	118,654	631,541	368,453
1958	63,184	31,019	1,036,616	776,765
1957	39,054	22,636	1,122,850	1,033,432

There is no export tax in Chile. The Government is encouraging the development of the fishing industry through its loan program and incentives to private capital. A law authorizes concessions and exemptions for entities engaged in any phase of the fisheries industry. Included is a 90-percent reduction in taxes on earnings and real estate, exemption from production, sales and stamp taxes, and free importation of boats, machinery, equipment, etc. Concessions are applicable to December 31, 1973, but entities are required to reinvest 75 percent of profits for the first 10 years in development of the industry.

Processing plants currently are purchasing whole shrimp at dockside for Ch/E 1.20 per case of 15 kilos or Ch/E 80 per metric ton (3.5 U.S. cents a pound or US\$76 per metric ton). The "langostino" sells at dockside for Ch/E 0.65 per 13-kilo basket or Ch/E 50 per ton (2.2 cents per pound or US\$47.63 per ton). The price of shrimp purchased for industrial use was Ch/E 70 per ton January-March and Ch/E 80 in April 1960. "Langostino" sold at Ch/E 50 (US\$48) per ton January-February, and Ch/E 60 (US\$57) March-April.

Crews on company-owned boats receive approximately 36 percent of the value of the catch. Trawlers have a 6- to 9-man crew. Each trip averages 5 to 7 hours. In midseason a trawler may catch 3 to 3½ tons of shrimp or "langostino." Captains earn about Ch/E 500 (US\$476) per month but master fishermen earn up to Ch/E 800 (US\$761). Crewmen average about Ch/E 100 (US\$95) per month.

Production costs average Ch/E 0.40-0.45 (38-43 U.S. cents) per pound of cooked frozen shrimp delivered dockside for export. Plant costs are as follows: peeling-Ch/E 0.051 (5 cents) per pound; washing and cooking-Ch/E .25 (2 cents) per pound; unloading, molding, freezing and packing-Ch/E 0.165 per pound (16 cents).

Labor costs are weighted by high Social Security payments; the employers' share amounts to 36 percent and the workers' share is 7.5 percent.

Exports of frozen shrimp from Chile to the United States have a freight rate of US\$110 per metric ton. Frozen "langostino" rates are US\$100 per ton provided the shipment does not exceed 75 cubic feet per 1,000 kilos (2,204.6 pounds) in size. "Langostino" shipments exceeding 75 cubic feet per 1,000 kilos pay US\$125 a metric ton.

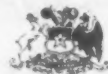
Shrimp landings increased substantially in 1960, and shipments are expected to equal if not exceed those of "langostino." In 1959 exports of shrimp were less than a quarter of "langostino" shipments. The increase is due in part to the declining price of "langostino" and to increased acceptance of small Chilean shrimp. Moreover, year-around fishing has proved to be profitable.

The United States is Chile's only export market for cooked, frozen shrimp. Some frozen "langostino" was sold in European markets during 1960. With increased shrimp landings, frozen cooked shrimp should move into those markets also.

Table 3 - Chile's Exports of Cooked Frozen Shrimp and "Langostinos," 1957-1960

	Shrimp		"Langostinos"	
	Quantity	Value	Quantity	Value
	1,000 Lbs.	US\$ 1,000	1,000 Lbs.	US\$ 1,000
1960 (Jan.-Aug.):				
Total Exports	367	156	740	374
United States	367	156	723	364
Germany	-	-	14	8
United Kingdom	-	-	2	1
Curacao	-	-	1	1
1959:				
Total Exports	74	25	902	445
United States	74	25	896	441
Germany	-	-	6	4
Bolivia	-	-	1/	1/
1958:				
Total Exports	62	-	1,064	2/
To United States	62	-	1,064	761
1957:				
Total Exports	33	23	842	660
To United States	33	23	842	660
1/ Less than 1,000 lbs. and US\$1,000.				
2/ Detailed data not available.				
Note: Values converted as follows: 1957 and 1958, Chilean peso 4.85461 gold weight 6 drams equals US\$1; 1959 and 1960, Chilean escudo 1.051 equals US\$1.				

Expansion in Chile's shrimp industry will be in the number of plants processing shrimp rather than the types produced. Locally-made cans do not meet United States Government specifications. The Chilean Government permits the import of foreign tinplate for canning purposes provided the product is for export. To date none of the fish-canning plants have entered the export market. (United States Embassy, Santiago, December 12, 1960.)



Colombia

FISHERIES NEED GOVERNMENT SUPPORT:

Landings of fish and shellfish in Colombia amounted to 30,102 metric tons in 1957 and 24,909 metric tons in 1958, mainly from the Magdalena River and tributaries. The fishing industry, which recently attracted considerable private investment, is in danger of dying out for lack of resources, if the Government does not carry out some investigations



Wood fishing boats carved from a single trunk on Richacha Beach, Colombia.

on the extent of the fish and shellfish stocks and institute conservation measures. Deep-sea fishing combined with a shrimp fishery could be profitable, with special incentives from the Government such as, marketing facilities, legislative measures, etc. In developing tropical river fishing, it would be necessary to create an extension fishing service. The fisheries training center in Buga could be used in the initial stage. (United States Embassy in Bogota, January 6, 1961.)

FISHERY TRENDS, DECEMBER 1960:

An official of the Colombian Hunting and Fishing Department of the Ministry of Agriculture will be assigned to Buenaventura as Chief of a new fishery research laboratory (Centro Piscicola de Buenaventura) scheduled to be opened in January 1961. This new laboratory will concern itself primarily with research in the Pacific coastal fishing grounds between Boca San Juan and Tumaco.

According to the official, fish research stations are already in operation at Buga (Valle) and Lake Tota, with a new center to be opened at Ciénaga shortly, which will be in addition to the Buenaventura station.

He also said that he recently spent about ten days in the Pacific coastal areas assisting a Japanese in making soundings and studying the possibilities for tuna operations along that coast. The Japanese also operate one tuna vessel along the Atlantic coastal areas,

which presently constitutes the only tuna operation in Colombian waters, states a December 19, 1960, dispatch from the United States Embassy in Bogota.



Costa Rica

SHRIMP INDUSTRY:

The fishing companies on the Pacific Coast of Costa Rica engaged in the shrimp fishery have not yet been able to overcome the economic and technical difficulties which have plagued them for years. Because of the virtual impossibility of obtaining bank credits, and the lack of interest by the National Production Council of Costa Rica, the shrimp fishermen have been obliged to sell exclusively to two shrimp-packing concerns. These concerns have been able to dictate their own price and terms as they are the only ones in a position to liquidate accounts with the fishermen upon their return to port with their catches. The Fishermen's Association of Puntarenas states that a loan of about US\$65,000 for financing is needed in order to place the industry on a sound footing. The Association claims that \$45,000 is needed to pay off an existing indebtedness with the present buyers, and \$20,000 for working capital from which fishermen could be paid for their catches, and which would be restored after final liquidation of the purchase with the foreign importer.

Total direct investment in the Costa Rica shrimp and fish industry is estimated at 9.5 million colones (about US\$1.4 million). Total direct and indirect investment (including ice plants, ship chandlers, boat repair, etc.) is calculated at 20 million colones (about US\$3.0 million). Roughly 800 families depend upon the industry, and this figure, in turn represents about 25 percent of the population of puntarenas.

The physical facilities of the Costa Rica shrimp industry are generally inadequate. Cold-storage facilities available on the mainland are operated by the National Production Council and the two independently-operated plants in Puntarenas. Handling and processing facilities ashore and aboard vessels could be improved upon without any significant additional cost. The poor local handling of shrimp generally results in a loss of at least 10 cents a pound.

Costa Rica (Contd.):

The Pacific Coast shrimp fleet of Costa Rica in the past operated only inside the Gulf of Nicoya in a fairly limited area and in shallow waters along the western shore, fishing at approximately 8 fathoms. As this protected area no longer produces suitable shrimp in commercial quantities, the fleet has extended its explorations into the coastal waters of the Pacific Ocean, from Cabo Blanco (at the mouth of the Gulf of Nicoya) as far north as the Nicaraguan border, offshore to about 60 fathoms. By operating at night, the catches of shrimp have improved. Shrimp caught in these open waters, upon being landed, are of a pronounced red coloration, and shortly thereafter turn a pinkish hue. Although not as big as the white shrimp, they are of a size big enough for export to the United States. The amount of shrimp caught in these open waters, as compared to previous catches in the protected waters of the Gulf, is more than twice as much. However, only 60 percent of Costa Rica's small fishing fleet is able to operate in the more hazardous open waters. A substantial quantity of "small shrimp" are still being caught along the coast south to Golfito.

On November 18, 1960, the Regional Advisor for Latin America, Fishing Division, of the Food and Agriculture Organization (FAO), was in San Jose to consult with the Minister of Economy and Finance and offer FAO scientific and technical assistance to the fishing industry. The project discussed would cost in the neighborhood of US\$993,000 of which Costa Rica would contribute about \$331,000, payable \$30,000-40,000 annually for a period of approximately five years. This matter, which is still in the tentative stage, would offer technical assistance in the fields of industrial processing, marketing, nutrition, location of shrimp-fishing grounds, and scholarships to qualified Costa Ricans to study marine biology and oceanography. Two fully-equipped boats would be sent to Costa Rica to conduct the ocean studies. The Minister of Economy reportedly was receptive to the proposed project.

There are no shrimp breeding or canning plants in Costa Rica, and heading, peeling, and deveining are done by hand. While the need for mechanization is generally recognized, there does not appear to be any effective program under way to achieve this improvement.

Landings of heads-on shrimp (including "tinies") during 1959 amounted to about 1,471,725 pounds. Estimated landings for 1960 are expected to fall short of the 1959 level by approximately 500,000 pounds. However, the 1960 figure, based on operational capacity, is more nearly normal. The 1959 figure was unusually high as an abnormally large number of young immature shrimp unsuitable for export were caught in the Gulf of Nicoya, prompting the Ministry to place restrictions on Gulf fishing in 1960. According to the statistics compiled by the Ministry of Agriculture and Industries, landings of shrimp during the years 1954-1958 inclusive, were as follows: 1954, 64,108 pounds; 1955, 304,720 pounds; 1956, 590,718 pounds; 1957, 187,240 pounds, and 1958, 782,120 pounds.

About 85 percent of the total landings is exported and the remainder consumed in the country. About all shrimp exports from Costa Rica are peeled and deveined and about 95 percent of the exports are destined for the United States. Small amounts have been exported to Curacao and Guatemala. The shrimp landings in 1959 had an export value of about \$675,000. In 1960, the value was expected to amount to about \$425,000.

The fleet of fishing vessels operating out of Puntarenas late in 1960 numbered 40 or double the number in operation about the middle of 1959. The boats include a few which are 65 feet long, about 50-ton displacement, equipped with modern double-trawling gear, and powerful engines. Most carry a crew of five, including the captain, and almost all have insulated holds.

The vessels of the Costa Rica shrimp fleet are mostly locally built and owned and are quite seaworthy. However, only two vessels are equipped with ship-to-shore radio and echo-sounders. A compass only is used for navigational purposes. In order to protect the marginal operations of the shrimp fishermen of Costa Rica, the use of foreign-built vessels has been prohibited. Because the better fishing grounds now are located further out to sea, and outside the territorial waters of Costa Rica, the restriction will hamper the effective development of the shrimp industry. Foreign-built vessels with modern fishing gear and equipment could do much to increase the shrimp catches of Colombia. The Association of Fishermen concedes

Costa Rica (Contd.):

that the law should be rescinded but feels the industry should be on a sounder footing before broaching the subject with the legislature of Costa Rica.

Construction work on six new boats in Puntarenas shipyards is temporarily suspended because of lack of funds. When complete, however, these are not expected to improve materially upon the present level of operations.

Local shrimp exporters pack shrimp in accordance with customary practice, i.e. in cartons of either under 10, 10-15, 16-20, 21-25, 26-30, 31-35, 36-40, 50-60, and 70-100 shrimp to the pound.

Quantity and Type	Shrimp Per Lb.	Lbs.	U.S. Cents a Lb.
43 x 50 lbs. P & D ¹ / Shrimp . . .	50-60	2,150	63
316 x 50 lbs. P & D Shrimp	70-100	15,800	of which
		(3,250)	(52)
		(3,500)	(55)
		(9,050)	(54)
450 x 24 lbs. P & D Shrimp No. 1 Pkgs.		10,800	50
40 x 50 lbs. Shrimp, Shell on . . .	Under 10	2,000	100
53 x 50 lbs. Shrimp, Shell on . . .	Under 15	2,650	87
25 x 50 lbs. Shrimp, Shell on . . .	16-20	1,250	86
19 x 50 lbs. Shrimp, Shell on . . .	21-25	950	78
13 x 50 lbs. Shrimp, Shell on . . .	26-30	650	72
3 x 50 lbs. Shrimp, Pink	21-25	150	70
5 x 50 lbs. Shrimp, Pink	26-30	250	68
7 x 50 lbs. P & D Shrimp	26-30	350	75
8 x 50 lbs. P & D Shrimp	36-42	400	70
Total		37,400	
¹ /Peeled and deveined.			

From the final total in table 1, the United States importer deducted his 10 percent commission, and the Letter of Credit advances made against warehouse receipts. The Costa Rican exporter is authorized by the United States company to obtain advances of approximately 75 percent of the total value of a given shipment.

Shrimp prices during 1960 were reported from 10-15 U. S. cents a pound less than in previous years.

There are export controls and a subsidy applicable to the fishing industry. An export tax of 2 percent ad valorem, based on the f.o.b. Puntarenas cost, is collected by the Government of all export shipments of "Crustaceans and Mollusks" (Public Law 1738 of March 31, 1954). Customs receipts in this category, which includes spiny lobster and shrimp, collected from January through No-

vember 1960, reported by the Customhouse of Costa Rica are shown in table 2.

Month	Colones	US\$
January	5,124	771
February	2,584	389
March	2,025	305
April	1,810	272
May	3,190	480
June	2,410	362
July	2,044	307
August	3,191	480
September	3,414	513
October	17,571	2,642
November	10,752	1,617
Total 11 Months	54,115	8,138

Customs receipts during December 1960 were expected to be about equal or slightly less than those in November. Prior to October, tax receipts were predominantly from shrimp exports. The significant rise in October was due to the lobster catch off Limon on the Atlantic side, which was unusually large in 1960.

A subsidy is received in the form of a preferential exchange rate at which dollars earned may be sold in the local exchange market. Formerly, 35 percent of dollars earned had to be sold at the official rate of 5.60 colones to US\$1; the balance at the legal free rate of 6.63 colones. From March 1960 to March 1961, the fishing industry can sell 99 percent of its dollars at the 6.63 rate. This, in a sense, is a subsidy which, it is understood, is being passed on to the fishermen in the form of higher prices paid for their catches. An export license is required for each shipment.

The customary method of shipping Costa Rican shrimp to the United States has been via air-cargo planes of the Costa Rican airline, from Puntarenas to Miami, Fla.--a flight of some 7 hours. At the insistence of his United States principal, one of the exporters still ships via this means for the New York market, and this costs the local exporter about 11 U. S. cents a pound, calculated on gross weight. The other local exporter is allowed to ship via ocean freight to New York, and benefits substantially from the approximate 4 cents a pound rate.

The processes of deheading, peeling, deveining, and packaging are performed by women and girls who are employed on a piece-work basis. A rate of 1.5 U. S. cents a pound is paid for deheading; 4.5 cents a pound is

Costa Rica (Contd.):

paid for peeling and deveining; and 15 cents a pound is paid for packaging. At such rates, girls earn from \$0.90-1.25 per hour. Working hours, however, are very irregular, coinciding with vessel arrivals.

The customary charge for freezer storage is CR\$0.10 (1.5 U. S. cents) a pound per month or fraction thereof. However, the refrigeration plant generally is asked to put an ice glaze on the shrimp, making the rate CR\$0.15 (2.26 U. S. cents) a pound. There are four ice-manufacturing concerns in Puntarenas. The customary charge for ice is 3 colones (about 45 U. S. cents) per 100-pound block. One refrigeration plant has a storage of 11,000 cubic feet, and the other in Puntarenas has a 100-ton normal storage capacity and a freezing capacity of 20 tons in 24 hours.

The Puntarenas shrimp industry calculates that an average of 6 U. S. cents a pound is spent on local processing, before refrigeration.

The average vessel catch, according to reliable sources at Puntarenas, is about 1,700 pounds of fish, 800 to 1,200 pounds of large shrimp, and 2,000 to 2,500 pounds of small shrimp. The sums realized by a vessel per trip, and the manner in which it is divided among the crew, is variable. Generally speaking, and with regard to the large shrimp, one-third of the catch is given to the crew which normally does not exceed five persons including the captain. However, each boat also brings in a substantial catch of small shrimp; and edible fish which is purchased by the National Production Council--50 percent of the tiny shrimp and fish catch goes to the vessel. Cost of provisions consumed during the trip is absorbed by the crew. The Council pays CR\$1.20 (about 18 U. S. cents) a pound for fish weighing 5 pounds or more; CR\$0.90 (about 13.5 U. S. cents) a pound for fish weighing from 2 to 5 pounds; and \$0.70 (about 10.5 U. S. cents) for fish weighing $\frac{1}{2}$ to 2 pounds.

Shrimp packers and exporters generally purchase headless shrimp from fishermen at the following rates: large shrimp, CR\$3.50 (about 52.6 cents) a pound; "pinkies," CR\$2.65 (about 40 cents) a pound; "tinies," CR\$0.80 (about 12 cents) a pound. As the small shrimp ("tinies") generally are purchased heads-on, packers pay 40 centimos (about 6 U. S. cents) a pound less when purchased with heads-on.

Fishermen average about 600 to 800 colones (US\$90-100) per month in wages.

The possibility of expanding the annual landings of shrimp in Costa Rica appears to be favorable. Additional boats are under construction, but it is felt that because of its relatively small size, Costa Rica cannot support a shrimp fleet much in excess of the present size. Physical expansion could take place through the use of larger and better-equipped vessels. For this purpose, however, it is felt that the law which prohibits the use of foreign-built vessels should be rescinded, in order to permit the utilization of such vessels by Costa Rican owners. Financial assistance, either governmental or private, also is needed to enable vessel owners to acquire needed radio and echo-sound equipment. A general lack of funds on all levels is reducing the efficiency and profitability of the local fishing industry. (United States Embassy in San Jose, December 19, 1960.)



Cuba

FISHERIES TRENDS, DECEMBER 1960:

According to a Cuban newspaper article of November 27, 1960, six vessels 28 feet in length have been purchased by the Matanzas Fishing Cooperative for expanding its activities.

Mention was also made of the inauguration of a new fisheries center building at Tunas de Zaza, Las Villas Province, on November 4, 1960.

The processing of dried turtle meat was also mentioned in the article as constituting a new industry at Isle of Pines, under the control of Cuba's Fishery Department. (United States Embassy, Habana, December 5, 1960.)



Denmark

FISH MEAL AND SOLUBLES PRICES, DECEMBER 4-10, 1960:

Export prices for Danish herring meal were being quoted at 780-790 Danish kroner per metric ton (US\$102.60-103.92 a short ton) f.o.b. Esbjerg, during the week of December 4-10, 1960. Protein content averaged about 70 percent. A week earlier, shipments to

Denmark (Contd.):

various destinations of herring meal of varying protein content had averaged 860 kroner per metric ton (US\$113.13 a short ton).

A single, small shipment of fish solubles to West Germany sold for 600 kroner per metric ton (US\$78.93 a short ton). (United States Embassy in Copenhagen, December 21, 1960.)

SHRIMP INDUSTRY (INCLUDING GREENLAND):

Denmark's shrimp industry was based for many years on the landings of the common shrimp (*Palaemon fabricii*) primarily to meet domestic demand. However, as demand began to outstrip the supply of this variety in the nearby waters of The Belt, Danish shrimp fisherman, in the years immediately preceding World War II, began to push out into the Skagerrak in pursuit of the deep-water shrimp (*Pandalus borealis*). After the War, while the landings of common shrimp leveled off to an annual average of about 200 metric tons, landings of deep-water shrimp gradually increased to 771 tons by 1956; and during the past four years deep-water shrimp output has tripled, reaching an estimated 2,450 tons in 1960. While expanding domestic demand continues to take the larger share of Danish shrimp production, there has been an equally sharp rise in exports, especially to the United States, in recent years.

Virtually all of the Danish catch of deep-water shrimp comes from the Skagerrak, from fishing grounds north of Skagens Gren, and the waters between Hanstholm and the Norwegian coast. The heaviest landings are made between March and October. Landings of common shrimp are concentrated between June and September, with most of the catch coming from waters of The Belt, especially from SmaalandsHAVET.

Located both in Copenhagen and at the major fishing ports throughout Denmark, the shrimp-processing plants are mostly small and independently operated, with no single company in a dominating position. There are presently about 25 canning plants and five freezing plants in Denmark which process shrimp. Most of the plants are highly mechanized, with a number of United States shrimp-peeling machines in operation.

Table 1 - Danish Pack of Canned Shrimp, 1956-59

Year	Raw Shrimp (Heads-on) Utilized	Pack of Canned Deep-Water Shrimp ^{1/}		
		Quantity	Value	
			1,000 Kroner	US\$
1959 . . .	2,170	643	12,532	1,814
1958 . . .	1,449	414	8,696	1,259
1957 . . .	982	273	5,170	748
1956 . . .	697	205	3,766	545

^{1/} Includes a small amount of common shrimp (estimated 50 tons annually).

Shrimp production in Greenland is a more recent enterprise, the shrimp-fishing grounds in Disko Bay, off Christianshaab and Jakobshavn, not having been discovered until 1948. Each of those beds, often described as the richest in the world and inexhaustible, is about 50 miles square, on a level sea floor.

In addition, some catches of deep-water shrimp are taken off Narssaq, further south along the West Greenland coast. Fishing and processing take place only during the summer months.

There are now two shrimp-canning plants in operation at Christianshaab, the second one having been opened during 1960. They employed 57 men, and 318 women during the 1960 season, turning out about 2.1 million 80-gram (2.5 oz.) cans and jars, almost double the 1959 output of the single plant that operated that year. A third factory for exploiting the Disko Bay beds is expected to be opened in Jakobshavn in 1961. There is also a shrimp-canning plant at Narssaq which turned out an estimated one million cans during the past season. A United States shrimp-peeling machine was installed in the factory which was opened in 1960. As a result of its satisfactory performance, another machine has been ordered for installation in the projected Jakobshavn plant. Freezing facilities exist at Egedesminde, also on Disko Bay, but so far they have used less than one-tenth of the Greenland shrimp landings.

The processing of, and trade in, shrimp is monopolized by the Royal Greenland Trade Department, as are most major Greenland economic activities. However, a proposal to permit a private Danish firm to construct and operate a shrimp plant at Godhavn, on Disko Island, is reportedly under consideration.

Landings of all varieties of shrimp by Danish and Greenland fishermen during the 1960 season are estimated at more than 4,500

Denmark (Contd.):

metric tons. While the Danish catch of common shrimp has not changed appreciably since 1956, landings of deep-water shrimp have increased threefold, and the total Greenland catch has shown an even greater increase.

of fresh and frozen shrimp almost tripled to 32 tons. In Greenland, starting from a higher 1956 base, the increase was not quite as great, but it reached 286 tons of canned and 35 tons of frozen shrimp in 1959.

The United States and the United Kingdom have become the principal export markets for

Table 2 - Landings of Shrimp (Heads-on) in Denmark and Greenland, 1956-1960

Year	Denmark						Greenland
	Common Shrimp			Deep-Water Shrimp			All Varieties
	Quantity Metric Tons	Value 1,000 Kroner	Value US\$1,000	Quantity Metric Tons	Value 1,000 Kroner	Value US\$1,000	Quantity Metric Tons
Jan.-Oct. 1960 ^{1/}	215	2/	2/	2,450	2/	2/	1,900
1959	195	1,649	239	2,191	6,573	952	949
1958	158	1,292	187	1,563	5,482	794	759
1957	294	1,297	188	1,051	3,426	496	673
1956	159	1,122	162	771	2,556	370	528

^{1/}Estimated.

^{2/}Unavailable.

Statistics are not available on what portion of the Danish fleet is devoted to shrimp fishing; Danish marine fisheries have traditionally relied largely on smaller inshore vessels. The small shrimp cutters used in the Skagerrak are generally operated by a skipper-owner with perhaps one or two crewmen, while most of the shrimp fishing in waters of The Belt is undertaken in small boats.

Sixteen small shrimp cutters were operating in Greenland waters during the 1960 season, one with a Danish skipper and the others operated by Greenlanders. During 1959, these vessels averaged a catch of about 500 pounds per vessel per fishing day. The fleet may be expected to grow with the opening of the new processing plant in Jakobshavn.

Little official information is available on shrimp prices in Denmark beyond an average yearly price computed by the Ministry of Fisheries.

Table 3 - Danish Average Ex-Vessel Prices for Shrimp, 1956-60

Year	Heads-on			
	Common		Deep-Water	
	Kroner Per Kilo	U.S. Cents a Pound	Kroner Per Kilo	U.S. Cents a Pound
1959	8.48	55.7	3.00	19.8
1958	8.17	53.7	3.51	23.0
1957	4.41	28.9	3.26	21.4
1956	7.05	46.3	3.32	21.8

While domestic users still account for the larger share of the consumption of fresh, frozen, and canned Danish and Greenland shrimp, more than one-third of the combined product is now being exported to foreign consumers. Between 1956 and 1959 exports of canned Danish shrimp increased fivefold by weight to 243 tons, while the less important exports

Denmark's canned shrimp, each taking close to 70 tons during 1959. France was the chief buyer of frozen shrimp, taking almost 25 tons.

During the first 10½ months of 1960 Denmark's exports of fresh shrimp totaled 6.3 tons valued at 19,000 kroner (\$2,755) and those of frozen shrimp (mostly re-exports from Greenland) totaled 24.1 tons valued at 139,000 kroner (\$20,155). France took the bulk of the frozen shrimp; 18.7 metric tons valued at 94,000 kroner (\$14,630). Sweden took most of the remaining frozen as well as most of the fresh shrimp exports.

Greenland's shipments of canned shrimp rose from 126 tons in 1956 to 171 tons in 1957, 266 tons in 1958, and 286 tons in 1959. While an exact breakdown is not available, somewhat over one-half of those amounts were shipped to Denmark, where they were either consumed locally or re-exported and included in the Danish export figures. The remainder were directly exported from Greenland ports to about 50 foreign countries.

With production of canned shrimp doubling in Greenland in 1960, it can be assumed that exports increased by a similar amount for that year.

In addition, Greenland exported 8 tons of frozen shrimp in 1956, 2 tons in 1957, 25 tons in 1958, and 35 tons in 1959, mostly via Denmark for re-export to France or Sweden.

With the Danish fishing industry highly efficient and competitive, government support schemes are of small importance and protection is moderate. Official fishery policies appear to be aimed at maintaining and improving the relatively favorable situation.

Denmark (Contd.):

A Danish Fisheries Bank facilitates the granting of loans to the fishing industry at slightly lower than the usual interest rates. Prior to 1959 the State Treasury had in effect guaranteed repayment of these loans, but now that function is performed by the Fisheries Bank itself through the issuance of second priority credits. These loans are limited to the construction or modernization of vessels and motors.

restrictions to these exports as the welfare of the Danish fishing industry may appear to require. Exports of fresh, frozen, and canned shrimp require licenses, though their issuance is largely a matter of formality for shipments to the dollar and European Payments Union areas.

Imports of canned shrimp from OEEC countries (and the dollar area, as well) are wholly liberalized; imports of fresh or frozen shrimp are not. There is no duty on fresh or

Table 4 - Denmark's Exports of Shrimp, 1956-60^{1/}

Destination	Jan.-June 1960			1959			1958			1957			1956		
	Quantity		Value	Quantity		Value	Quantity		Value	Quantity		Value	Quantity		Value
	Metric Tons	1,000 Kr.	US\$ 1,000	Metric Tons	1,000 Kr.	US\$ 1,000	Metric Tons	1,000 Kr.	US\$ 1,000	Metric Tons	1,000 Kr.	US\$ 1,000	Metric Tons	1,000 Kr.	US\$ 1,000
Canned:															
United States	35.2	299	43	66.1	547	79	58.9	519	75	32.6	282	41	11.0	113	16
West Germany	18.2	163	24	4.1	43	6	2.2	31	4	1.8	22	3	0.1	1	-
United Kingdom	7.8	80	12	68.2	727	105	27.5	281	41	4.2	46	7	5.8	57	8
Sweden	6.3	73	11	10.0	121	18	13.1	169	24	10.0	126	18	12.2	147	21
South Africa . .	6.3	55	8	9.9	84	12	8.9	73	11	13.3	107	15	1.2	14	2
Italy	6.8	53	8	6.6	50	7	7.5	60	9	3.0	27	4	-	-	-
France	6.2	46	7	11.8	112	16	1.5	12	2	1.9	19	3	2.1	22	3
New Zealand . .	2.0	27	4	1.7	29	4	3.8	44	6	12.3	116	17	-	-	-
Rhodesia . . .	3.5	24	3	20.0	191	28	3.3	33	5	2.4	22	3	0.5	8	1
Others	19.4	178	26	45.2	450	65	23.7	243	35	21.2	221	32	11.6	146	21
Total	111.7	998	146	543.6	2,354	340	150.4	1,465	212	102.7	988	143	44.5	508	72
Other Than Canned:															
France	8.4	24	3	24.9	141	20	21.9	123	18	9.9	50	7	1.3	2	-
Sweden	0.8	4	1	4.1	47	7	2.2	36	5	8.4	50	7	3.0	14	2
United States .	-	-	-	-	-	-	0.1	1	-	1.4	17	2	4.5	66	10
Others	1.7	9	1	3.7	18	3	0.1	1	-	1.2	22	3	3.7	84	12
Total	10.9	37	5	32.7	206	30	24.3	161	23	20.9	139	19	12.5	166	24

^{1/}Include re-exports of shrimp delivered to Denmark from Greenland.

Exporters of shrimp to the dollar area could presumably benefit from provisions of the Danish dollar export premium scheme, which in effect permits the shipper to realize a four percent net premium on exports to that area. This little used scheme is due to expire at the end of 1961.

frozen shrimp imports, but there is a one krone per kilogram duty (about 6.6 U.S. cents a pound) on imports of prepared or preserved shrimp in hermetically-sealed containers, and of 0.50 krone per kilogram (about 3.3 U.S. cents a pound) in other than hermetically-sealed containers.

Table 5 - Value of Greenland's Direct Exports of Canned Shrimp to Countries Other Than Denmark, 1956-59

Destination	1959		1958		1957		1956	
	1,000 Kroner	US\$1,000	1,000 Kroner	US\$1,000	1,000 Kroner	US\$1,000	1,000 Kroner	US\$1,000
United States . .	311	45	256	37	216	31	105	15
United Kingdom	146	21	131	19	-	-	-	-
Sweden	138	20	169	24	143	21	145	21
South Africa . .	79	11	57	8	115	17	13	2
France	57	8	12	2	18	3	18	3
Italy	48	7	60	9	27	4	-	-
Nigeria	46	7	36	5	11	2	13	2
Switzerland . .	43	6	-	-	-	-	-	-
Rhodesia	34	5	38	6	15	2	-	-
Belgian Congo .	32	5	36	5	16	2	-	-
Ghana	28	4	11	2	12	2	-	-
Other	138	20	78	11	131	19	91	13
Total	1,100	159	884	128	704	103	385	56

While there are no special taxes on the shrimp industry, the Ministry of Fisheries has very broad control powers over exports of fish and fish products, and can apply such

The 1960 average hourly wage (full "wage package") for women employed in fish- and shrimp-processing plants in Denmark is 4.07 kroner (about 59 U.S. cents). In Greenland

Denmark (Contd.):

women employed in the shrimp factories earn an average wage of only 2.60 kroner (about 38 U. S. cents) per hour. However, this Greenland average includes underage girls employed part-time during the rush season, and excluding them the average rises to about 3.00 kroner per hour (about 44 U.S. cents).

Danish fishing boats are, as a rule, owned and operated by individual fishermen and the crews generally work on a share basis. In addition to the full-time fishermen, there are a considerable number of part-timers who work on their own small farms or are employed as unskilled laborers when they are not occupied in fishing. While exact information about the income of the fishermen is not available, it appears that full-time fishermen earn incomes comparable to those of industrial workers. For example, in the important west coast fishing town of Esbjerg a recent survey put the average annual income of a fishing skipper at about 18,000 kroner (about US\$2,614), that of a part-time fisherman at about 14,500 kroner (about US\$2,106), that of a cannery worker at about 15,000 kroner (about US\$2,179), and that of an unskilled metal worker at about 13,000 kroner (about US\$1,888).

There is no evidence that the immediate further expansion of the Danish shrimp industry is hampered by any lack of shrimp resources, but tight money and full employment might have the effect of slowing down such expansion. Rationalization of the processing industry could presumably provide a way around the labor shortage, but the tight liquidity situation hampers the floating of loans for industrial expansion.

In Greenland, there is still unexploited shrimp resources, and with a third cannery due to be opened soon in the Disko Bay area, production and exports of canned shrimp can be expected to continue to grow. (United States Embassy in Copenhagen, December 1, 1960.)

Note: Kroner converted at following rates: 1956 and 1957 - 6.914, 1958 - 6.906, 1959 - 6.908, and 1960 - 6.885 kroner equal US\$1.



Ecuador

NATIONAL INSTITUTE TO EXPAND AND STUDY FISHERIES:

The Ecuadoran Registro Oficial No. 18 of September 21, 1960, contained the Plan of Operations for the National Fisheries Institute in Guayaquil agreed to by the Government of Ecuador and the Food and Agriculture Organization (FAO) of the United Nations on behalf of the United Nations Special Fund.

The Plan provides for four-year financing through contributions of US\$633,800 by the Special Fund and the sucre equivalent of US\$663,050 by the Government of Ecuador. The FAO will operate the Institute in collaboration with the Ministry of Development. According to the Plan, the Institute will assist the Government in substantially expanding Ecuador's fishing and related industries by studying the distribution and density of fish in Ecuadoran waters and the best ways of exploiting such resources, as well as assisting the Government in establishing an adequate fisheries administration and analyzing the judicial, administrative, and institutional factors which bear on the development of the fishing industry.

The Plan provides that FAO will supply the Director of the Institute, technicians, necessary equipment not supplied by the Ecuadoran Government, and scholarships for Ecuadorans who would eventually replace FAO technicians. The cost of these items is estimated at \$45,800 and is part of the Special Fund's contribution of \$633,800. The Government of Ecuador will provide a building for the Institute, equipment and laboratory space in Manta, and ships, equipment, and personnel of the Ecuadoran Navy. The value of these items is set at \$150,000 and credited against the Government's scheduled contribution of \$663,050. (United States Embassy in Quito, December 20, 1960.)

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SHRIMP INDUSTRY:

Although Ecuador's shrimp exports in 1959--all of which went to the United States--represented only slightly more than 3 percent of the country's exports, they ranked fourth in value among export items and were the only significant evidence of progress towards diversification in Ecuador's export trade pattern. The recently inaugurated Velasco Administration has announced its intention to develop further Ecuador's largely unexploited fisheries.

In a recent press conference, the Director of Fisheries in Guayaquil stated that the Ministry of Development will put into action a fisheries development program which

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Ecuador (Contd.):

will provide for scientific efforts to increase landings of fish and the creation of fishing cooperatives along the coast which will receive Governmental aid in the form of equipment. The National Fisheries Institute, supported jointly by the Ecuadorian Government and the United Nations Special Fund, was expected to be inaugurated in January 1961 and will play a significant role in developing Ecuador's fisheries.



A shrimp trawler under construction on a beach in Ecuador.

Considering that there has to date been only haphazard exploitation of Ecuador's fisheries, the application of modern methods and a conscious effort to expand the industry will almost certainly increase Ecuador's landings of fish over the long term, perhaps significantly. Shrimp will probably continue to be the most actively exploited fish export.

By the end of 1959, Ecuador's shrimp fishing fleet had increased to 165 vessels, all under domestic ownership. This total compares with 119 vessels in 1958 (includes 29 foreign-owned vessels), 144 vessels in 1957 (includes 29 foreign-owned vessels), and 107 vessels in 1956 (includes 27 foreign-owned vessels). Landings of shrimp in Ecuador during 1959 amounted to 2,843 metric tons valued at US\$4.2 million (probably export value).

Table 1 - Ecuador's Shrimp (Heads-On) Landings, 1956-59

Year	Quantity	Value
	Metric Tons	US\$1 Million
1959	2,843	4.2
1958	1/ 2,721	4.1
1957	2,137	3.0
1956	2,342	2.5

1/ Landings were reported on a gross basis in 1958; for other years data are net tons.

Source: "Memoria del Gerente del Banco Central," 1959.

Exports of frozen shrimp by Ecuador of 2,569 metric tons in 1959 were just about double the 1,284 tons exported in 1956. From 1956 to 1959 shrimp exports increased steadily, but probably leveled off at about the 1959 total or less in 1960.

Table 2 - Ecuador's Shrimp (Heads-Off) Exports, 1956-59 and Jan.-June 1960

Year	Country of Destination	Quantity	Value ^{1/}
		Metric Tons	US\$1,000 (f.o.b.)
1960 (Jan.-June ..	United States	2/ 1,126.44	1,464.4
1959	United States	2/ 2,569.35	3,854.0
1958	United States	2/ 2,221.00	3,351.5
	Bolivia	.55	.8
	Total	2,221.55	3,352.3
1957	United States	1/ 1,858.00	2,601.2
1956	United States	1/ 1,284.00	1,412.4

1/ Value converted at estimated f.o.b. prices of: 1956, US\$1,100 per metric ton; 1957, US\$1,400 per ton; 1958, US\$1,500 per ton; 1959, US\$1,500 per ton; and 1960, US\$1,300 per ton.

2/ Gross tons.

3/ Net tons.

Source: Central Bank statistics.

In accordance with Monetary Board Resolution No. 342 of April 1, 1960, exporters must surrender \$100 per metric ton of proceeds from exported shrimp to the Central Bank at the official rate of 15.00 sucres to US\$1.00. The excess over \$100 per metric ton (about \$1,200) may be exchanged in the free market where the rate is currently about 18.00 sucres to US\$1.00. Resolution 342 was actually favorable to shrimp exporters in that it reduced the amount of export proceeds required to be surrendered to the Central Bank at the official rate by \$200.

Duties on Shrimp Exports: Frozen shrimp S/0.40 per net kilogram (about 1.21 U. S. cents a pound), and dried shrimp S/0.15 per net kilogram (about 0.363 U. S. cents a pound).

Annual Taxes on Vessels and Fishermen: S/25.00 (about US\$1.67) per net registered ton for Ecuadorian flag vessels of less than five tons; S/50.00 (about US\$3.33) per net registered ton for all vessels exceeding five tons; S/3.00 (about 20 U. S. cents) on each fisherman's registration card; and S/5.00 (about 33.3 U. S. cents) on each fisherman's registration in addition to ordinary stamp tax payment.

Other Taxes on All Exports, Including Shrimp: 1/2 percent ad valorem for Manabí, Esmeraldas, Los Rios, and El Oro port improvement; 1/2 percent ad valorem for Guayaquil and Babahoyo port improvement; 1 percent on freight charges and passenger fares; and 1 percent ad valorem on exports through Guayaquil and El Oro Province.

Port and Other Fees: S/10.00 (about 66.7 U. S. cents) per ton as port fee; S/1.00 (about 6.7 U. S. cents) per ton as statistics fee; S/0.05 on each 300 pounds (about 2 U. S. cents a short ton) for inspection and stamps. (United States Embassy, Quito, December 7, 1960.)

Note: All duties, taxes, port and other fees are converted at rate of S/15 equal US\$1.



German Federal Republic

FISH MEAL PRICES, DECEMBER 7, 1960:

Prices reported at Hamburg Commodity Exchange as of December 7, 1960, for fish meal delivered ex-Hamburg warehouse, or c. & f. West German sea port:

German Federal Republic (Contd.):

Type of Fish Meal	Protein Content (%)	Delivery	DM/Metric Ton	US\$/Short Ton
German fish meal	50-55	prompt/Dec. 1960	445.00	96.08
" " "	55-60	" " "	462.50	99.86
" " "	60-65	" " "	485.00	104.71
" " " standardized brands	60-65	Dec. 1960	550.00	119.82
Angola fish meal	65-70	Dec. 1960	1/	1/
Peruvian fish meal	65-70	prompt	475.00-480.00	102.55-103.63
" " "	65-70	Jan. 1961	415.00	89.60
" " "	65-70	Feb.-Dec. 1961	395.00	85.28

1/Not available.

Note: Values converted at rate of 4,2017 deutsche marks equal US\$1.

As compared with November 25, 1960, fish meal prices on the West German market on December 7, 1960, were higher for prompt delivery, but prices for Peruvian fish-meal futures (Feb.-Dec. 1961) were down \$1 a short ton. (United States Consulate, Bremen, December 12, 1960.)

FISH MEAL PRICES, JANUARY 6, 1961:

Prices reported at Hamburg Commodity Exchange as of January 6, 1961, for fish meal delivered ex-Hamburg warehouse, or c.&f. West German sea port were as follows:

Type of Fish Meal	Protein Content (%)	Delivery	DM/Metric Ton	US\$/Short Ton
German fish meal	50-55	prompt/Jan. 1961	450.00	97.16
" " "	55-60	" Apr. 1961	477.50	103.09
" " "	60-65	" " "	497.50	107.41
" " " standard- ized brands	60-65	Jan. 1961	550.00	118.75
Angola fish meal	65-70	Jan. 1961	515.00	111.20
" " "	65-70	Feb. 1961	450.00-455.00	97.16-98.24
Peruvian fish meal	65-70	prompt	497.50-505.00	107.41-109.04
" " "	65-70	Jan. 16-31, 1961	470.00-472.50	101.48-102.01
" " "	65-70	Feb. 1-15, 1961	447.50	99.62
" " "	65-70	Feb. 16-28, 1961	437.50	94.46
" " "	65-70	Mar. 1961	420.00	90.68
" " "	65-70	Apr.-June 1961	400.00	86.37
Norwegian herring meal ..	72.75	Jan. 1961	560.00-565.00	120.91-121.99

Note: Values converted at rate of 4,2017 deutsche marks equal US\$1.

As compared with December 7, 1960, fish meal prices on the Hamburg exchange on January 6, 1961, were higher for both domestic and imported fish meal. (United States Consulate, Bremen, January 11, 1961.)

FISHING INDUSTRY PREFERS
STERN TRAWLING:

It is reported from Hamburg that German fishing vessel owners are not building any more side trawlers. All existing German contracts for side trawlers have been converted to stern trawlers.

The changeover is being effected so quickly that people in the German fishing industry

are now describing side trawlers as "modern scrap." Owners are finding it difficult to procure crews for the obsolete types. (Fishing News, December 16, 1960.)



Ghana

TUNA FISHERY SHOWS PROMISE:

Studies conducted by a United States firm in collaboration with the Ghana Government have shown preliminary indications that the Guinea Gulf has an abundance of tuna particu-

larly during the summer and fall. A single Ghana-registered purse-seiner is now fishing tuna for local consumption and fleets of United States and Japanese vessels based in Takoradi are catching tuna for shipment elsewhere.

A fleet of Soviet trawlers, also based in Takoradi, is fishing for other species, some of which are being sold in Ghana to meet local refueling costs. Local sales by Japanese and Russian trawlers have had a noticeable downward effect on fish prices. (United States Embassy in Accra, January 10, 1961.)



Greece

IMPORT DUTIES ON
SELECTED FISHERY PRODUCTS:

Current ad valorem duty rates on fishery products imported into Greece are:

Crustaceans and molluscs, whether or not in shell, fresh (live or dead), chilled, frozen, salted, in brine or dried; crustaceans in shell, simply boiled in water: (1) crustaceans such as lobsters, shrimp, crawfish, crabs, etc., 30 percent; (2) molluscs (mussels, clams, oysters, snails, etc.), 30 percent; and (3) octopus, cuttlefish, squid, etc., 25 percent.

Canned fish and shellfish: tuna and salmon, 22 percent; canned fish other than sardines or the like, tuna, and salmon, 25 percent; oysters and mussels and the like, 22 percent; lobster, shrimp, and crawfish, 25 percent; crab, etc., 25 percent; cuttlefish, octopus, squid, etc., 20 percent; and red caviar, 480 drachmas per 100 kilograms (about 0.73 U. S. cents a pound).

Byproducts: fish meal, inedible, 6 percent; and fish meal and shellfish meal edible, 15 percent. (United States Embassy in Athens, November 25, 1960.)

* * * * *

STERN FREEZER-TRAWLER FINDS
FISHING POOR OFF NEWFOUNDLAND:

The Greek stern trawler *Evangelistria IV* which fished the Newfoundland banks in November 1960 did not get a very good return from the trip, according to the December 1960 issue of *Alieia*, a Greek fishery periodical. The vessel fished for cod on the Flemish Cap and sought ocean perch on other Newfoundland banks, but the results were unsatisfactory. When the weather conditions off Labrador became poor, fishing was discontinued in that area and the vessel headed for the banks it usually fishes off the coast of Mauretania, Northwest Africa. The vessel reported that no Russian factoryships were seen while fishing off Newfoundland. (*Fiskets Gang*, January 5, 1961.)



Greenland

LARGE FISH-PROCESSING
PLANT PLANNED:

There are plans to build a large fish-processing plant in Godthaab, Greenland, with an annual capacity of 10,500 metric tons of raw fish, from which quick-frozen fillets will be produced and exported. The operation will be a joint venture by Greenland, Danish, and Faroe Island interests.

* * * * *

SHRIMP LANDINGS SET RECORD IN 1960:

Shrimp landings during the 1960 season at Christianshaab, Disco Bay, Greenland, set a new record, according to the December 1960 issue of *Dansk Fiskeritidende*, a Danish fishery periodical. The 16 small shrimp cutters based there caught almost 1,500 metric tons of shrimp with an ex-vessel value of 1,196,679 Danish kroner (about US\$174,000). The new shrimp-processing factory which began operations during the past summer made it possible to increase production 81.3 percent. (*Fiskets Gang*, January 5, 1961.)



Iceland

EX-VESSEL FISH PRICES
BEING NEGOTIATED:

Late in December 1960, negotiations were under way between representatives of Icelandic fishing vessel owners and the fishermen's unions regarding ex-vessel prices for the main fishing Icelandic season from January-May 1961. As of the end of 1960, the negotiators were still far from reaching an agreement. The fishermen on the vessels were demanding a wage increase of 77 percent.



Typical Icelandic fisherman.

* * * * *

FISH LANDINGS IN WEST GERMANY
UPSET MARKET:

The West German fishing industry claimed late in December 1960 that direct landings of

Iceland (Contd.):

fresh fish by Icelandic fishing vessels at German ports during the Christmas season upset the market and price situation. West German industry charged that the Icelandic vessels failed to conform to the usual agreement on landings and were largely to blame for sharply lower prices and the large amount of fish sold to the reduction plants.

The Icelandic vessels were unable to land at British ports because of the dispute between Iceland and Britain over fishing limits off the coast of Iceland. Therefore, about the only fresh fish market available to the Icelandic fishing vessels is that in Germany.

SHRIMP INDUSTRY:

The shrimp industry of Iceland had its beginning in small experiments carried out between 1935 and 1937. It did not assume the proportions of a full-scale industry until 1945. At present, this industry is relatively small as compared with the cod and herring fisheries. However, its potential for expansion is considerable, particularly if the present trend toward mechanization of processing continues.

Mechanization offers the best hope of overcoming the manpower shortage which handicaps this industry as it does most other sectors of Icelandic industry. A further advantage of mechanization lies in the fact that by reducing the number of persons employed at relatively high wages, it may enable the industry to lower prices.

The high quality of the small Icelandic cooked shrimp (*Pandalus borealis*) assures a good demand and markets for the product.

The shrimp fishing grounds are located off the northwest coast of the island; the Isafjordur area is the center for processing. Recently there has been some investigation of shrimp fishing possibilities off the east coast of the island. Shrimp are available from the end of August through the early part of May.

There are five shrimp-processing plants in the northwest part of the island. Three are located in Isafjordur and two are located, respectively, in Langeyri (Alftafjordur) and Bldudalur. Each of the plants employs between 40 and 60 workers, except the one new plant at Langeyri which is entirely mechanized and employs six persons. Two of the plants at Isafjordur and the one at Bldudalur peel shrimp entirely by hand. At the third plant in Isafjordur the shrimp are peeled principally by machinery. The single plants at Langeyri and Bldudalur do their own freezing. The plants at Isafjordur have their freezing done in fish-freezing plants.

Except in the case of those lacking freezing facilities, complete processing operations are carried out in each plant, i.e., peeling, canning, and packing. No shrimp breeding is done in Iceland. There is a decided trend toward mechanization, but its growth will depend in large measure on market demand. For example, in Great Britain and France there is a marked and traditional preference for hand-peeled shrimp, probably due to the latter's more pleasing appearance inasmuch as mechanization tends to deform the shrimp in contrast to hand-peeling.

The only available statistical estimates in Iceland place the annual landings of shrimp at 2,000 metric tons (heads-on) for the years 1956-1960. As packed, the weight is considered to be 17 percent of the whole heads-on weight.

The number of vessels participating in shrimp fishing varies somewhat from year to year. In 1959 it was 14; in 1960 it was 19.

The size of the vessels also varies, being from 7 to 18 gross registered tons. The average-size vessel is of 12 gross registered tons. All boats are equipped with Diesel engines of 30-100 hp. The average vessel has a motor of 50-60 hp.

There are no special construction programs nor definite plans for additions to the present shrimp fleet. Such programs or plans are not needed. There are only two known shrimp grounds at present, although investigations might lead to the discovery of more which could be exploited commercially. This, of course, limits the number of vessels that can pursue this type of fishing. On the other hand, funds are now available for research trips to be organized next summer in search of new grounds. The catch per boat is relatively small and as the main catch is taken in shallow waters ("in-fjord"), large vessels are not used. Almost any of the smaller multi-purpose fishing boats can be converted to shrimp vessels inexpensively. Therefore, special shrimp boats are not required.

Future discoveries of new and promising shrimp grounds will determine whether a vessel-building program will be necessary.

All shrimp vessels are locally owned and run by individuals who, however, may enter into specific agreements with the processing factories.

Table 1 - Iceland's Export Prices (f.o.b.) for Processed Shrimp, 1957-59 and January-October 1960

Product	1960/ Mar.-Oct.	1960 Jan.-Feb.	1959	1958	1957
 (Kronur per Kilogram)				
Shrimp, frozen 2/	69.45	38.89	33.19	27.54	35.98
Shrimp, canned	82.91	46.45	47.88	42.81	46.32

1/ New exchange rates for Icelandic kronur.

2/ Both in the shell and peeled.

Note: Value of Icelandic kronur: 1957-59 and Jan.-Feb. 1960--16.26 kronur equals US\$1; March-Oct. 1960--38.00 kronur equals US\$1.

The shrimp industry, like all other Icelandic export industries, is subject to export licensing. In order to obtain a license, the individual exporters must apply to the Ministry for Commerce which controls issuance.

Table 2 - Iceland's Exports of Processed Shrimp, 1956-60

Product & Destination	1960	1959	1958	1957	1956
 (Metric Tons)				
Frozen shrimp:					
United States	36.7	14.6	10.5	27.8	40.9
United Kingdom	59.4	41.8	57.6	12.4	10.5
Other	1/ 21.4	1.2	1.4	2/ 31.1	0.1
Total	117.5	57.6	69.5	71.3	51.5
Canned shrimp:					
United States	3.6	-	-	-	-
United Kingdom	-	33.1	11.0	0.5	-
Finland	24.5	27.6	17.9	11.3	31.1
Denmark	9.9	8.5	29.1	11.7	0.4
Czechoslovakia	-	6.0	19.7	5.3	-
Other	0.9	10.2	0.1	-	-
Total	38.9	85.4	77.6	28.8	31.5

1/ Mostly Denmark, Netherlands, and West Germany.

2/ Includes 31.0 tons exported to East Germany.

Since the February 1960 devaluation, a temporary export tax of 2.5 percent on fish products has been in effect. It was expected to remain in effect until at least the end of 1960.

There is an identical wage rate of Icelandic kronur 22 (57.9 U.S. cents) per hour in all sectors of the processing operations (peeling, canning, freezing, etc.). Workers in the in-

Iceland (Contd.):

dustry are also protected by various social security fringe benefits.

Payment of fishermen is effected as follows: there are two men per boat and they each are entitled to one-third of the catch; the other third goes to the owner of the boat. The canning factories pay the fishermen for the raw material as follows: 3 kronur 25 aurar per kilo (about 3.9 U.S. cents a pound) with heads on. During the off-season, the fishermen obtain employment in other activities. (United States Embassy, Reykjavik, December 2, 1960.)



Italy

FISHERY TRENDS, JANUARY 1961:

Italy and Yugoslavia have signed an agreement, effective until February 28, 1962, which allows Italian fishermen to fish in certain limited zones of the Adriatic Sea claimed by Yugoslavia as territorial waters. Negotiations for a similar agreement with Tunisia are being conducted in an attempt to end a fishery dispute which has led to the seizure of Italian trawlers operating off the coast of Tunisia.

The Italian Ministry of Merchant Marine has announced that it will present to Parliament a plan called "Piano Azzurro" for the Italian fishing industry. The principal features of the plan are: (1) industrialization of the fisheries; (2) creation of additional cooperatives for fishermen; and (3) extension of Italian fishing activities to Atlantic Ocean waters in addition to the Adriatic and Mediterranean Seas, where Italian fishing is presently concentrated. (United States Embassy in Rome, January 13, 1961.)

FISHING FLEET:

Because of restrictions imposed by some Mediterranean countries like Tunisia and Yugoslavia, the Italian Government is studying a plan to develop its ocean-going fishing fleet.

The Ministry of Merchant Marine divides the motorized fishing fleet into two categories: (1) Vessels of 100 gross registered tons and over and (2) Vessels of under 100 gross tons, both types provided with the "Nationality Act," a certificate which authorizes the vessel to operate beyond territorial waters. As of July 1, 1960, the first group consisted of 54 vessels totaling 14,338 gross

tons, and the second group 1,725 vessels totaling 52,683 gross tons.

A vast program for the complete reorganization of the motorized fishing fleet is being studied by the Italian government. As of July 1, 1960, there were being built in Italian shipyards, for Italian owners, 5 trawlers totaling about 1,000 gross tons.

There is only one well organized fishing company in Italy which employs its vessels (6 units totaling 7,000 GRT) in North Atlantic waters to fish for cod, etc. The company owns freezing plants. (United States Embassy, Rome, November 30, 1960.)

PARTICIPATION IN ATLANTIC FISHERIES CONSIDERED:

Italian Government circles believe that the territorial-water situation in the Mediterranean is making it necessary for Italy to develop an Atlantic Ocean fishing fleet. Fishing fleet operators in south Italy are considering this possibility and have been encouraged by the recent appropriation of 1 billion lire (about US\$1.6 million) for aid to fishermen. This amount is in addition to the recent "Tambroni Law" amendment which extends shipbuilding subsidies and various fiscal exemptions to fishing vessels. During 1960, several large used fishing trawlers were purchased from foreign owners to be reconditioned and equipped for Atlantic fishing. (U. S. Embassy in Rome, December 30, 1960.)

SHRIMP INDUSTRY:

Landings of shrimp in Italy during 1959 amounted to 2,811 metric tons, somewhat less than the 2,924 tons reported for 1958. Two types of shrimp are included in the landings--white (averages 2.5 inches long with head on) and red (5 inches long with head on). The white variety made up about 60 percent of the total shrimp landings in both 1958 and 1959. Most of the shrimp landed in Italy are caught by trawlers in the waters of the Adriatic Sea and south of the Island of Sicily and are sold fresh in domestic markets. There are no shrimp-canning plants in Italy, and very little is frozen. Shrimp landings are fairly steady throughout the year. However, landings of crabs and lobsters are more important than shrimp. Landings of all crustaceans (including shrimp) amounted to 7,632.5 tons in 1957, 8,155.5 tons in 1958, and 8,523.3 tons in 1959.

Italy (Contd.):

Table 1 - Italy's Imports and Exports of Crustaceans^{1/}, 1957-59

Origin or Destination	Imports			Exports		
	Quantity	Value		Quantity	Value	
	Metric Tons	1,000 Lire	US\$1,000	Metric Tons	1,000 Lire	US\$1,000
1959:						
France	2,052.9	339,651	547	178.5	155,715	251
Yugoslavia	568.8	128,311	207	-	-	-
United Kingdom	935.2	217,980	351	-	-	-
Other	1,059.8	244,297	394	13.6	14,215	23
Total	4,616.7	930,239	1,499	192.1	169,930	274
1958:						
France	-	-	-	91.0	80,618	129
Yugoslavia	508.8	117,312	188	-	-	-
Other	45.8	20,400	33	56.1	37,115	59
Total	554.6	137,712	221	147.1	117,733	188
1957:						
France	-	-	-	169.0	156,269	250
Yugoslavia	431.4	120,015	192	-	-	-
Other	43.7	16,743	27	25.7	22,793	36
Total	475.1	136,758	219	194.7	179,062	286

^{1/}Includes fresh, cooked, salted, and dried.

Italian statistics on imports and exports of fishery products do not separate shrimp from the other crustacean species. In 1959, imports of fresh, cooked, salted, or dried crustaceans amounted to 4,617 metric tons valued at about US\$1.5 million. This represents a sharp increase over the 555 tons valued at US\$221,000 imported in 1958. Exports of crustaceans in 1959 amounted to 192 tons as compared with 147 tons in 1958 and 195 tons in 1957. (United States Embassy, Rome, November 30, 1960.)



Japan

AGREEMENT ON TRANSHIPMENTS OF ATLANTIC TUNA DRAFTED:

The Japanese Export Frozen Tuna Fisheries Association met on December 15, 1960, to discuss the problem of Atlantic tuna brought home to Japan by common carriers, which has been under study for some time as a means of stabilizing the world tuna market. The Association approved the Board of Directors' draft agreement on the condition that shipments be continued on a flexible basis.

For the period between March and June of 1961, it is decreed that the shipment of 7,000 metric tons of Atlantic tuna to Japan would be mandatory, but the shipment of an additional 3,000 tons would be voluntary. The losses resulting from marketing the fish in Japan would be shared equally by those engaged in the Atlantic tuna fisheries.

Following the discussions on the Atlantic tuna problem, the freezer carriers' proposal to increase the quota of frozen albacore for shipment to the United States was presented. A lively discussion was held on the following points: (1) The present quota (30,000 tons) of frozen albacore for shipment to the United States does not meet the needs of the United States. Perhaps the quota is inadequate. (2) Twenty thousand tons (of the export quota) have been consumed between April and November 1960. It would seem that this could be interpreted very favorably. In the end it was agreed that a study regarding the disposition of the present albacore quota, whether adequate or not, would be conducted. (Nippon Suisan Shimbun, December 16, 1960.)

INCREASED EXPORTS OF ATLANTIC ALBACORE TUNA TO U. S. UNDER STUDY:

The Japanese Export Frozen Tuna Fisheries Association is studying the problem of increasing exports of frozen albacore tuna to the United States in anticipation of a good albacore season in the Atlantic Ocean.

The present quota of Atlantic Ocean frozen albacore for export to the United States is 5,000 short tons for the Japanese fiscal year which ends March 31, 1961. Of this amount, nearly 3,500 tons have already been exported. A catch of 4,500 tons was expected for January to March 1961, which means an excess of 3,000 tons over the present quota. The Association was studying problems involved in exporting this 3,000 tons to the United

Japan (Contd.):

States. (Nippon Suisan Shimbun, January 13, 1961.)

1961 AGREEMENT ON CANNED TUNA-IN-BRINE EXPORTS TO U. S.:

The Japanese Canned Food Exporters Association's standing committee on tuna met in December 1960 to study the agreement on the export of canned tuna-in-brine to the United States. This agreement was to be submitted for approval to the Association's general meeting on December 16, 1960. The new agreement is effective January 1, 1961, to November 30, 1961. Affected are canned tuna-in-brine, tuna spread, and tuna pet food. Canned tuna-in-brine quota is 2,200,000 cases.

The first sale, which was arranged with the Tokyo Canned Tuna Joint-Sales Company, consisted of 200,000 cases (150,000 cases of whitemeat and 50,000 cases of lightmeat) and was scheduled for loading in December 1960 and January 1961. The price per standard case was the same as before, whitemeat \$9.15 a case and lightmeat \$6.80 a case. (Nippon Suisan Shimbun, December 16, 1960.)

EXPORTS OF CANNED SKIPJACK TUNA IN OIL, 1959:

Exports of canned skipjack tuna in oil by Japan in 1959 amounted to 1,288,726 cases. Japan's best customer for the product in 1959 was West Germany with imports of 518,236 cases, or 40.2 percent of the total exports.

Japanese Exports of Canned Skipjack Tuna in Oil, 1959	
Country of Destination	Quantity
	Cases
Canada	23,720
Netherlands	49,538
Belgium	76,248
Britain	67,080
West Germany	518,236
Switzerland	39,253
Italy	39,511
Marta	32,528
Egypt	39,178
Syria	70,279
Lebanon	82,029
Other countries (Middle Near-East)	191,487
Others	59,639
Total	1,288,726

EXPORTS OF FROZEN TUNA TO YUGOSLAVIA, JANUARY-MARCH 1961:

The Japan Frozen Food Exporters Association has started to handle all frozen tuna exports to Yugoslavia through one channel--the association itself--for delivery in January-March 1961. During that period, 11 Japanese vessels are scheduled to deliver 4,380-4,480 metric tons of frozen tuna to Yugoslavia.

The prices are \$300 c.i.f. & c. on albacore and \$280 c.i.f. & c. on yellowfin. As the Yugoslavian side had offered to pay \$290 on albacore and \$270 on yellowfin, negotiations took place and both sides agreed on \$280 on yellowfin. Talks in mid-December were still going on and they were expected to result in a price of around \$290 on albacore. The Yugoslavian side is said to be satisfied with the quantity offered (Suisan Tsushin, December 13, 1960.)

PRICE SET FOR CANNED TUNA EXPORTS TO WEST GERMANY:

Fifteen large Japanese exporters holding actual export records of canned tuna in oil to West Germany held a meeting and established prices on exports to that country. They also agreed not to sell at lower prices in the future. The agreed prices are: US\$7.30 c.i.f. a case on canned skipjack and yellowfin, 48 7-oz. cans; \$4.50 c.i.f. a case on canned skipjack and yellowfin, 48 3½-oz. cans; \$6.80 c.i.f. a case on canned big-eyed and Indian tuna, 48 7-oz. cans; \$4.00, c.i.f. a case on canned big-eyed and Indian tuna, 48 3½-oz. cans.

The canned tuna in oil market in West Germany is making rapid strides, and it is now the major importing country for Japan's pack of canned tuna in oil. (Japanese newspaper, December 2, 1960.)

50,000 CASES OF CANNED TUNA IN BRINE SHIPPED TO UNITED STATES:

The Tokyo Canned Tuna Sales Company shipped 50,000 cases of canned tuna in-brine to the United States in December 1960. This shipment, which was loaded by December 10, included 20,000 cases of whitemeat tuna (7-oz. cans at \$9.15 per case) and 30,000 cases of lightmeat tuna (7-oz. cans at \$6.80 per case). Including the 1,880,000 cases shipped previously, exports for 1960 as of December 10

Japan (Contd.):

totalled 1,930,000 cases. (*Nippon Suisan Shim-bun*, December 16, 1960.)

EXPORTS OF CANNED TUNA OTHER THAN IN BRINE OR OIL, 1956-59:

Japanese exports of miscellaneous packs of canned tuna (other than canned tuna in brine or oil, in 1959 amounted to 20,900 cases (valued at US\$122,706). This amount was down sharply from the 58,984 cases exported in 1958, but was higher than the exports for 1956 and 1957.

Japanese Exports of Canned Tuna (Other than in brine or oil), 1956-59								
Country of Destination	Quantity				Value			
	1959	1958	1957	1956	1959	1958	1957	1956
 (Cases) (US\$)			
United States	3,265	3,744	2,483	3,154	17,964	19,000	15,761	26,958
United Kingdom	4,819	15,876	-	-	36,417	106,494	-	-
Canada	159	1,493	17	2	1,292	10,917	142	17
West Germany	962	18,350	-	-	5,542	100,089	-	-
Ryukyu Islands	500	1,825	15,887	2,883	2,167	5,011	46,411	9,881
Italy	2,586	6,139	595	-	7,806	33,269	3,681	-
Others	8,609	11,557	426	476	51,518	75,212	2,622	2,006
Total	20,900	58,984	19,408	6,515	122,706	351,992	68,617	38,862

PACKERS ASK FOR SUBSIDY TO STABILIZE RAW ALBACORE TUNA PRICE:

Some Japanese tuna packers are calling for adoption of measures to stabilize raw albacore tuna prices. The Japanese price of raw albacore tuna has crept beyond the packers' profit-making level of 60 yen per kilogram (US\$166.70 a metric ton) due to poor albacore catches for the past three years.

In January 1958, raw albacore in Japan sold for 65 yen per kilogram (\$180.50 a ton); in June 1959, 155 yen per kilogram (\$430.50 a ton). The price per kilogram paid for raw albacore in 1960 was: March, 85 yen a kilo (\$236.10 a ton); April, 110 yen a kilo (\$305.50 a ton); May, 115 yen a kilo (\$319.40 a ton); June, 115 yen a kilo (\$319.40 a ton); July, 123 yen a kilo (\$341.60 a ton); August, 111 yen a kilo (\$308.30 a ton); September, 95 yen a kilo (\$263.80 a ton).

The Japanese export price for whitemeat tuna canned in brine, on the other hand, has decreased. Some exporters hope to export only name Japanese brands which can com-

pete with United States products. In fact, a plan for consolidating brands has been suggested. However, the basic problem is high raw tuna prices. To correct this, it will be necessary to establish a fund for stabilizing fish prices, according to *Nippon Suisan Shim-bun*, January 11, 1961.

NEW POLICY ANNOUNCED ON LICENSING TUNA VESSELS:

On December 4, 1960, the Japanese Fishery Agency announced a new policy concerning the licensing of tuna vessels. The purpose is to offset the depressive conditions facing the Japanese tuna fleet.

The salient features of the policy are:

A. **Medium-Class Tuna Vessels** (over 40 tons but less than 100 tons): (1) Vessels under 70 tons, after reaching a stipulated age (wooden vessels - 6 years, steel vessels - 12 years) and vessels in this size category lost at sea, can be replaced with vessels up to 100 tons. Tonnage replacement shall not be required. (To build a new vessel, say one of 100 tons, a vessel owner has to furnish a license for a vessel of the same size. The old vessel would then be taken out of the fishery. If a shipowner wanted to build a vessel of 100 tons and owned a vessel of only 50 tons, he has to purchase the license of another 50-ton vessel from another shipowner or possibly go into partnership with him. He can then build a 100-ton vessel by putting up the licenses of the two 50-ton vessels, providing other requirements can be met. The two 50-ton vessels would then be taken out of the fishery. The purpose of this practice is to control the size of the fishing fleet.) (2) Vessels over 70 tons but less than 100 tons, after reaching a stipulated age (wooden vessels - 6 years, steel vessels - 12 years), by following certain procedures, can be classified as distant-water vessels through an exchange of licenses with distant-water vessels eligible for tonnage replacement purposes.

B. **Distant-Water Fishing Vessels**: (1) Vessels which previously had been allowed to increase their tonnage up to 180 tons shall now be permitted to increase their tonnage up to 180 tons. Tonnage replacement shall not be required. (2) Vessels under 180 tons, after reaching a stipulated age (wooden vessels - 6 years, steel vessels - 12 years) and those in this size category which have sunk, can be replaced with vessels up to 240 tons. Tonnage replacement shall not be required. (3) Previously, only medium-class tuna vessels could be used for tonnage replacement for the purpose of constructing larger vessels. Henceforth, distant-water vessels less than 180 tons can also be used for tonnage replacement under certain conditions (See A-2). (4) In the past when replacing vessels of over 240 tons with new large-

Japan (Contd.):

er vessels, the allowable increase in tonnage was calculated by subtracting 200 tons from the proposed total tonnage of the new vessel, then taking one percent of the balance, and adding seven tons to it. This practice shall henceforth be discontinued.

C. Vessels Engaged in Two Fisheries: (1) Regardless of type of vessel, the licensing period shall be for six months or less. (2) Restrictions on ports of landing shall be eliminated.

D. Special Licenses: (1) Special licenses can be granted to medium-type vessels (engaged in one fishery only) under 70 tons. They shall be good for a period of five years or less.

E. Vessels Changing over from Salmon Fishery to Tuna Fishery: (1) The "carry over" of licenses shall be permitted. (2) Vessels after reaching a stipulated age (wooden vessels - 6 years, steel vessels - 12 years) and vessels in this group which have sunk, can be replaced with vessels up to 100 tons. Tonnage replacement shall not be required.

F. Others: Concerning items A-1, A-2, B-2, and E-2, vessels reaching the stipulated age can be replaced with larger vessels if they have engaged in their respective fisheries continuously for three years or longer. However, once conversion is made and the vessels engage in the fishery continuously for three years beginning December 2, 1960, then these vessels can be replaced with larger vessels even if management has not operated the vessels for three years. Tonnage replacement in this case shall not be required.

The Fishery Agency undertook a study of the Japanese tuna fishery for the first time in 1960 because of the depressed conditions facing the fishing fleet in the 70- to 180-ton class. The smaller vessels in the 70- to 80-ton range were hard pressed economically by the well-equipped vessels under 40 tons, which require no license; those in the 180-ton group which primarily fish for tuna and bonito were also showing signs of operational stagnation.

Until now, the tuna fleet has been unable to build suitable vessels due to many existing restrictions. For example, vessels under 100 tons were classified as medium-type and those over 100 tons as distant-water type. At the same time the fisheries themselves were divided into a medium-type fishery and distant-water tuna-bonito fishery. Vessels classified as medium-type were not allowed to operate in areas classified as distant-water fishing grounds. Also, the construction of new larger vessels was not permitted without tonnage replacement.

The Fishery Agency felt that these policies were not suitable to existing conditions and came out with its new policy concerning the licensing of the tuna fleet. There still remains a distinction between medium-type vessels and distant-water vessels but this appears to be a formality only and a way has been opened for medium-type vessels to switch to distant-water type. This is covered in provision A-2.

In the past, only the medium-type vessels could be scrapped for tonnage replacement. This practice is now being extended to the distant-water vessels as well. In this case, one-half of the tonnage of the distant-water vessel (to be scrapped) can be used by a party seeking to build a larger vessel, and this 50 percent has to be put up as tonnage replacement. In the case of medium-type vessels, the practice has been to allow one-third of the tonnage of the vessel (to be scrapped) to be used as tonnage replacement for the construction of one boat. (Nippon Suisan Shimbum, December 7, 1960.)

COMPANY FILES APPLICATION TO FISH FOR TUNA OFF URUGUAY:

One of the large fishing Japanese companies filed an application late in November 1960 with the Japanese Fishery Agency for approval of the company's plan of sending its vessel Eikyo Maru, a 250-ton tuna long-liner, on charter to Uruguay. If approved, the Eikyo Maru was to depart from Tokyo before the end of 1960. On arrival in Uruguay, the vessel will engage in tuna fishing in the adjacent waters off the Rio de la Plata under a 3-year fish sales contract with Uruguay's national fisheries organization. The operation base will be Montevideo.

The Atlantic area off Uruguay had been under study by the Japanese company since 1958. The Uruguay organization has been asking for the tie-up with the Japanese for some time. (Japanese newspaper, November 30, 1960.)

ITALY IMPORTANT USER OF FROZEN TUNA:

Italy, an important user of Japanese frozen tuna, especially that produced by Japanese vessels in the South Atlantic, is receiving considerable attention in Japanese fishery periodicals. There is a difference of opinion as to the amount of frozen tuna Italy can use. One group in Japan claims the Italian market can absorb 50,000-70,000 metric tons, but Japanese exporters set the figure at some 30,000 tons.

Judging from the fact that 26,000 tons were shipped to Italy in 1960 and the price declined to as low as \$200 per ton, an issue of the Fisheries Economic News in November 1960 pointed out that 20,000 tons can possibly be shipped to Italy under the present system of unregulated shipments and far in excess of 30,000 tons if shipments are regulated.

Japanese vessels operating in the Indian Ocean are prevented from shipping to the Atlantic European countries because of the poor market conditions.

The Japanese periodical also points out that new countries are starting to fish for tuna. For example Yugoslavia is pushing the construction of tuna vessels of its own.

Japan (Contd.):

TUNA FISHING TRENDS IN INDIAN OCEAN AND SOUTH PACIFIC:

Tokai University's Fisheries Research Institute released a report on Japanese tuna fishing in the South Pacific and the Indian Ocean.

Indian Ocean: Indian tuna (a variety of tuna found in the Indian Ocean related to bluefin) fishing had rapidly improved in the latter part of August 1960 in the eastern Indian Ocean (sea area off Java and the small Sunda Islands) but it fell off in mid-October 1960 to 4.4 metric tons a day on the average. Although Indian tuna fishing on the high seas declined to 5.5 tons a day, its operational area was spreading and catches were comparatively good. In mid-November schools of Indian tuna were discovered around 30°-31° S. latitude. Albacore fishing was good in the western Indian Ocean and around Madagascar at 5 tons a day. Yellowfin fishing around the equator continued poor.

South Pacific: In the sea area southeast of Hawaii, 125°-155° W. longitude, Japanese tuna fishing was generally poor while fishing grounds at the south latitudes were improving gradually, especially for big-eyed. Yellowfin fishing became active between 6° and 7° S. latitude, 117°-121° W. longitude. Both albacore and yellowfin fishing was quiet between 26°-27° S. latitude in the Coral Sea. Not much yellowfin was seen around Palau, New Guinea, Kusai, and Jaluit in the central-southern sea area, but small-sized yellowfin fishing was comparatively good at the fishing grounds, south side of the Solomon Islands. (Fisheries Economic News, November 22, 1960.)

CATCHES OF INDIAN OCEAN TUNA DROP DRASTICALLY:

According to information obtained in December 1960, Japanese catches of Indian tuna in the area west of Australia extending from 102° E. to 109° E. and from 22° S. to 28° S. had fallen drastically. Fishing operations were started a month earlier in 1960 and catches remained good, averaging 5 to 6 tons per day in early November. Approximately 50 vessels were concentrated in that area in November and December.

However, from November 27 on, catches fell drastically and in December averaged 1

to 2 tons a day. This is the first time that this has happened, occurring just when fishing was expected to reach its peak. The fishermen were having difficulty locating good fishing grounds.

One explanation given for this poor fishing is the appearance in substantial numbers of killer whales, which were not seen on the tuna grounds in past years. Killer whales were in evidence in the area 100° E. to 105° E. and as far south as 28° S. and they are said to have chased the tuna away. Some feel that the large number of killer whales appearing in the area may have caused the Indian tuna to leave the grounds temporarily or may have caused them to move to distant areas completely. At any rate, the fluctuation in the catch of Indian tuna coming as it did towards the beginning of the new year was expected to push up the price. (Nippon Suisan Shimbun, December 12, 1960.)

PACKS OF CANNED FISHERY PRODUCTS LOWER IN 1960:

Exports of canned fishery products for 1960 by Japan were estimated at the beginning of the year to exceed 10 million cases. Actual exports, however, amounted to about 85 percent of the 9.6 million cases exported in 1959. The exports of canned fish and shellfish in 1960 were affected by poor tuna fishing and decreased production of canned salmon, trout, and crab.

The decrease from 1959 to 1960 was considerable in the packs of canned salmon and trout--dropped to almost half of the 2,830,000 cases packed (flat No. 2 can, 96 cans per case) in 1959. Canned crab meat pack in 1960 did not exceed 500,000 cases or not quite 75 percent of 1959's 658,000 cases.

The decreased exports of canned salmon and crab meat were caused by (1) reduced catch quota, and (2) the small carryover from 1959. Tuna canned in oil exports in 1960 were only about 70 percent of the 1.6 million cases exported in 1959 due to poor skipjack tuna fishing.

Canned oysters and cuttlefish pack in 1960 amounted to about 70 percent of the 1959 pack due to poor fishing (280,000 cases of canned oysters and 200,000 cases of canned cuttlefish in 1959). Tuna canned in brine and canned sardine packs in 1960 were slightly less than in 1959 (2,070,000 cases of canned tuna in brine and 630,000 cases of canned sardines in 1959).

Japan (Contd.):

Increases in the packs of canned fishery products in 1960 as compared with 1959 occurred for mackerel and horse-mackerel. The pack of horse-mackerel is estimated to be about three times the 200,000 cases packed in 1959. Although the 1960 pack of canned mackerel-pike was extremely poor, the 1960 exports are expected to exceed the 800,000 cases exported in 1959. (Suisan Tsushin, January 4, 1961.)

CRAB FISHERY COMMITTEE PROPOSALS FOR 1961:

The Japan Fishery Society is reported to have held the meeting of its crab committee and discussed the industry's attitude on crab fishing for 1961 during Japan-Soviet fishery talks. The following three points were decided to be presented to the Japanese Fishery Agency:

(1) Quota for 1961 to be 280,000 cases for Japan's four factoryship fleets as compared with 260,000 cases in 1960;

(2) Abolish regulations (prohibited areas, the length of nets, etc.) on operations in order to permit both Japan and Russia to carry out operations in accordance with their capacities; and

(3) Change the opening day for fishing from the 1959 date of April 13 to April 1, 1961. (Japanese newspaper, January 4, 1961)

STUDIES ON BROWNING OF CANNED CRAB MEAT:

Crab meat, soaked and washed in water to extract and remove amino acids and reducing sugars, shows less browning on canning than untreated crab meat. Temporary preservation of the boiled meat in ice water is also effective.

Browning may occur if crab meat is heat-processed at 110° C. (230° F.) for 85 minutes. The degree of the browning of the claw meat is distinctly greater than that of meat from other parts, whereas no visible difference is apparent between the browning of the shoulder and leg meat. The amounts of volatile basic nitrogen, total nitrogen, amino nitrogen, and reducing sugars are larger in

claw meat than in meat from other parts. When the pH of meat is over 6.5, browning increases with increasing pH. (Bulletin of the Japanese Society of Scientific Fisheries, 24(12):971-77, 1959.)

FISH MEAL PRODUCERS BEING ORGANIZED:

The Japanese Fisheries Agency is actively pushing the establishment of an organization to represent the manufacturers who use waste to produce fish meal. Already, an organization called the "Japan Fish Meal-Fish Oil Producers Association" has been established in Hokkaido.

The Fishery Agency hopes to begin by organizing regional groups, then establish a national organization encompassing the fish flour industry as well. For the present, the regional associations would not engage in economic ventures, such as joint marketing, but would concentrate on controlling production, exchanging information, and conducting political activities directed towards domestic and foreign consumer groups.

The problem of Japanese imports of Peruvian fish meal had not been resolved between the Fishery Agency and livestock people and the Fishery Agency hoped to seek an amicable settlement through the establishment of an association which would serve as chief spokesman for the meal industry in negotiations to maintain a balance in the feed-supply market, as well as improve the preparation of data and background information. (Nippon Suisan Shimbun, December 7, 1960.)

FISH MEAL PARLEY ENDS WITHOUT AGREEMENT:

Japan's Second Conference for Adjusting the Supply and Demand of Fish Meal was held on December 2, 1960, in Tokyo. Participants included the Fishery Agency, meal factory (mothership) companies and producers, and users representing their respective interests. The problems of supply and demand and Peruvian fish meal imports were discussed, but the meeting ended in a deadlock with the producers and users holding divergent views.

Informed circles in the Fishery Agency feel that the discussions have been exhausted and the problem will now be resolved through political settlement.

Japan (Contd.):

Japanese market conditions for the period November 1960 to March 1961 are forecast by the different groups to be as follows:

Fishery Agency: Fish meal (from waste)--79,764 metric tons, Northern Pacific meal--52,537 tons, Total--132,301 tons. Exports--4,155 tons. Potential supply--128,146 tons.

Livestock Bureau: Demand: 78,500 tons through allocated channels; 4,000 tons for independent raisers; total--82,500 tons, in storage: 23,000 tons.

Supplies to meet these demands are forecast by industry as 7,000 tons from waste; 40,000 tons from the North Pacific operation; total--47,000 tons. Should 30,000 tons be imported for January-March 1961, this will total 77,000 tons.

On the other hand, the producers claim that of the 15,000 tons of North Pacific meal consigned earlier to the domestic users, deliveries up to November 15 (until which date the producers had to pay storage) amounted to only 5,552 tons. This seems to indicate that the users have more than enough on hand.

FISH-MEAL PRICES, 1960:

Average wholesale fish-meal prices quoted by the Aquatic Oils Association of Japan and export prices based on Japanese Customs returns by months for 1960 were as follows:

Japanese Fish-Meal Average Prices, 1960 by Months				
1960 Average Prices	Domestic Wholesale Prices		Export Price (f.o.b.)	
	US\$ per Metric Ton	US\$ per Short Ton	US\$ per Metric Ton	US\$ per Short Ton
January	153.33	139.10	130.00	117.94
February ...	143.33	130.08	140.00	127.01
March	135.83	123.22	135.00	122.47
April	129.72	117.68	125.00	113.40
May	131.39	119.20	120.00	108.86
June	130.28	118.19	123.00	111.59
July	129.72	117.68	123.00	116.12
August	119.17	108.11	120.00	108.86
September ..	121.94	110.62	136.00	123.37
October	141.67	128.52	1/	1/
November ...	147.22	133.56	1/	1/
December (10-day average)	148.61	134.82	1/	1/
1/Not available.				

(United States Embassy, Tokyo, January 3, 1961.)

AGREEMENT REACHED ON FACTORYSHIP FISH MEAL PRICE:

Following negotiations between Japanese buyers and producers regarding prices for 40,000 metric tons of factoryship fish meal scheduled for release on the Japanese market, agreement was reached on the price of 56,500 yen (US\$156.94) per metric ton (about US\$142.38 a short ton) for January 1961 deliveries.

Considerable differences existed in the original prices asked by each group. Originally, the producers wanted 56,800 yen (\$157.78) per metric ton. On December 24, 1960, the buyers offered 55,700 yen (\$154.72) a ton for December deliveries and 56,500 yen (\$156.94) a ton for January deliveries. Not wishing to protract negotiations further, the producers agreed to accept the January price offer. (*Nippon Suisan Shimbun*, January 9, 1961.)

OUTLOOK FOR FISHERIES IN 1970:

A division of the Japanese Economic Council has submitted to the Government plans to double Japan's gross national product by 1970.

Outlook for Japanese Fisheries in 1970 as Compared With the 1956-58 Average		
Fishery	1970 (1,000 Metric Tons)	Average 1956-58
Total fisheries production	7,401	5,228
Pelagic fisheries	4,236	2,839
Salmon-trout fisheries	190	181
Crab fishing	61	61
Large-size and other trawling in northern seas	612	35
Large-size and other trawling in South China Sea	15	12
Large-size trawling, west of 130°	18	18
Other trawling, west of 130°	351	319
Skipjack hook-and-line	223	179
Tuna long-line (mothership type and landings abroad included)	477	276
Medium-size trawling	650	534
Purse seining	820	681
Mackerel-pike dip nets	614	427
Mackerel hook-and-line	205	123

Note: Sum of fisheries categories does not equal grand total since there seems to be some duplication among the categories listed.

The committee's report on the modernization of Japanese agriculture includes the outlook on fisheries production by principal species in 1970. (*Suisan Tsushin*, December 7, 1960.)

FISHERY AGENCY AUTHORIZES CONSTRUCTION OF 840 FISHING VESSELS:

From April 1 to December 5, 1960, the Japanese Fishery Agency had approved the

Japan (Contd.):

construction of 840 fishing vessels. Of this number, 570 are wooden vessels (22,621 gross tons) and 270 steel vessels (82,329 gross tons). The steel vessels include large supply vessels and trawlers.

Bonito-tuna vessels totaling 295 make up about one-third of the new construction. Most of these are under 40 gross tons, reflecting the switchover made by fishermen from other less stable fisheries following the Fishery Agency announcement that bonito-tuna vessels in that category will not require licenses. Only two tuna vessels in the medium-class category (70-ton range) are being constructed. However, this figure does not include some vessels which will be fishing for tuna part of the time. (Fishing Industry Weekly, No. 296, December 25, 1960.)

TRAWLER FISHING REPORTED GOOD OFF NORTHWEST AFRICA:

A Japanese company reports that its vessel Amagi Maru (large-size trawler of 2,350 tons) began fishing near the Canary Islands, off the northwest coast of Africa early in December 1960. The vessel reported a catch of several species, including high-priced sea bream. Catches exceeded expectations. As much as 40 metric tons of fish a day were caught on the average, and the freezing equipment could not keep up with the catch. This made it necessary for the vessel to discard the lower-priced species. (Fisheries Economic News, December 8, 1960.)

LARGE FISHING COMPANY PLANS TO INVEST OVER \$13 MILLION:

The president of the largest Japanese fishing company plans to invest 5 billion yen (US\$13.9 million) for facilities and equipment in 1961.

The following outlays are planned: (1) Construction of a new fodder (feed) plant (expected to be completed in April 1961). (2) Construction of a 5,000-ton class freezer-vessel. (3) Construction of two 1,500-ton distant-water trawlers. (4) Construction of ten two-boat trawlers as replacements. (5) Construction of new cold-storage facilities and food canneries and expansion of existing facilities (a 4,000-ton capacity cold-storage plant will be built at Osaka). Plants at Shimo-

noseki, Nagasaki, and Shiogahama will be expanded. (6) Construction of several tuna long-line vessels. (7) Expansion of mink farm in Hokkaido; and (8) Investment in an oil company. (Nippon Suisan Shimbun, December 12, 1960.)



Korea

EXPANSION OF OFFSHORE FISHERIES PLANNED:

The Korean Office of Marine Affairs of the Ministry of Commerce and Industry plans to send a fishing fleet to the Bering Sea, according to a press report in the January 12, 1961, issue of Pacific Business Service. Reported plans call for a 5,000-ton factoryship which will process the catch for export, and eight 80-ton trawlers. In addition, plans are being made, according to the press report, to increase the number of deep-sea vessels operating off Samoa and to promote fishing in the Indian Ocean and around the "Peace Line." (United States Embassy in Seoul, January 13, 1961.)



Kuwait

SHRIMP INDUSTRY:

The shrimp industry of Kuwait as of late 1960 was confined to a single Kuwaiti firm. The two active shrimp vessels fish about 35-40 miles off the Kuwaiti coast, east and south of the island of Failaka. The only processing plants are those on board ship. The shrimp are deheaded, machine-sorted for size, packed by hand in five-pound boxes, and blast-frozen aboard the vessels. The five-pound cartons are then packed in 50-pound master cartons and stored on the vessels until transferred to ships in Kuwaiti harbor. The shrimp season runs from August to May as a rule.

The partial 1959/60 season's catch of about 240,000 pounds will probably be increased sharply in the 1960/61 season. Assuming no major voluntary or forced alteration of the potential pattern, the two Kuwaiti vessels should land about 500,000 pounds of shrimp this season. This figure will increase substantially if the two new vessels ordered for this season arrive in time for operations. One large 150-ton-capacity vessel was due in December 1960 and it was expected to be

Kuwait (Contd.):

in operation in the last half of the season. The time of arrival of a fourth vessel of less than 10-ton capacity was uncertain as of November 30, 1960.

The shrimp trawlers carry on the average 6 to 8 natives to assist in the manual tasks of trawling and deheading the shrimp. The bulk of the other tasks are handled by United States experts.

Persian Gulf shrimp, according to the United States observers, is the "white" variety. The 1960 catch, made toward the end of the August 1959-May 1960 season, averaged 16-20 count. Catches in November 1960 were mostly 21-25 count, but the trawlers expect larger shrimp as the season ends. Practically all shrimp caught by the Kuwaiti shrimp vessels are larger than 35 shrimp per pound.

In 1960, shrimp processing for export was a monopoly of a single company. Another group, sponsored by a leading Kuwaiti shaykh, has established contact with a British firm to launch a wide-scale fishing industry in the Gulf and seeks a United States connection especially for the shrimp industry. As currently conceived, the operation would include fishing in the entire Gulf, with processing plants located further south in Dubai. This company expects to utilize the native fishing fleets, the United States Consul in Kuwait reported on November 30, 1960.



Malaya

JAPANESE-MALAYA FISHERY COMPANY PLANS TUNA PLANT CONSOLIDATION:

The joint Japanese-Malaya fishery products company at Penang planned to combine its two canneries (each has a packing capacity of 200 cases a day) in March 1961 in view of the favorable acceptance of its canned tuna in oil in West Germany, Denmark, Sweden, and the Netherlands.

The corporation's largest customer is West Germany. A British firm is presently handling sales to that country at a contract price of \$100,000 for 15,000 cases. This contract expires in April 1961.

Sales in Denmark and Holland are being handled exclusively through a Japanese company. The export price is said to be over \$6.00 per case f.o.b. Penang, which is higher than the \$7.30 c.i.f. price in the exporters' agreement set by the Japanese Canned Food Exporters Association.

The company in Malaya was established jointly by the Overseas Fishing Company of Japan and by Malayan packers. At present, four vessels, each of about 100 tons, fish for the company. They average about one trip of albacore and yellowfin a month. (Nippon Suisan Shimbun, December 19, 1960.)



Mexico

ENSENADA SPINY LOBSTER FISHERY TRENDS, DECEMBER 1960:

As of December 20, 1960, a total of 742,174 pounds of spiny lobsters had been landed by lobstermen along the coast of Baja California. This total is said to be below normal, but it is expected that by the end of the October 1, 1960-March 15, 1961 season, a total of 1,400,000 pounds will have been produced.

One reason for the lower total at the end of the year was some bad weather around Ensenada. It was also due in part to the inactivity of the lobstermen at the Bahia de las Tortugas, one of the most productive areas. The lobster cooperatives there did not work during October pending resolution of a dispute over the management of the cooperatives. The dispute was resolved by placing new men in charge of the cooperatives. (United States Consulate in Tijuana, January 16, 1961.)

SHRIMP INDUSTRY:

Statistical data on landings of shrimp in Mexico by species or size are not collected. The only available statistics are those of the Direccion General de Pesca e Industrias Conexas which collects data on cooked-peeled, dry with shell, dry without shell, fresh heads-on, and fresh headless shrimp.

The Statistical Office of the Mexican Bureau of Fisheries estimates that the heads-on weight of the 1960 shrimp catch will amount to about 76,000 metric tons, or about 25 percent more than the 1959 catch of 61,000 tons. Other sources believe that this estimate for 1960 landings is too high and that 1960 landings will be about 10 percent above the 1959 landings, or about 67,000 metric tons.

According to the National Chamber of the Fishery Industry there are 895 shrimp trawlers operating in Mexico--357 in the Gulf of Mexico and 538 in the Pacific. It is believed that not all of these trawlers are operating. One source, for example, said that on a recent count there were only 105

Mexico (Contd.):

Table 1 - Mexico: Production of Shrimp Products Converted to Heads-On Weight to Estimate Shrimp Landings, 1959

Area	Products Produced					Estimated Total Landings
	Cooked Peeled	Dry with Shell	Dry Peeled	Fresh Heads-On	Fresh Headless	
	(Heads-On Weight in Metric Tons)					
Pacific	8.8	2,132.4	16.8	2,488.7	39,586.7	44,233.4
Gulf of Mexico	271.0	1,694.4	125.6	95.9	14,615.8	16,802.7
Total	279.8	3,826.8	142.4	2,584.6	54,202.5	61,036.1
Conversion Factor used	3.25	3.00	7.30	1.00	1.68	-

Table 2 - Mexico: Production of Shrimp Products Converted to Heads-On Weight to Estimate Shrimp Landings, 1960

Area	Products Produced					Estimated Total Landings
	Cooked Peeled	Dry with Shell	Dry Peeled	Fresh Heads-On	Fresh Headless	
	(Heads-On Weight in Metric Tons)					
Pacific	10.4	2,559.0	20.4	2,986.4	49,483.2	55,059.4
Gulf of Mexico	325.3	2,033.1	150.4	115.1	18,269.8	20,893.7
Total	335.7	4,592.1	170.8	3,101.5	67,753.0	75,953.1

working trawlers in Salina Cruz. More trawlers were present but they were tied up.

Vessel distribution by ports is as follows: Gulf Coast: Tampico, 24; Frontera, 10; Ciudad del Carmen, 229; and Campeche, 94. Pacific Coast: San Felipe, 26; Golfo Santa Clara, 21; Puerto Penasco, 47; Guaymas, 185; Topolobampo, 53; Mazatlan, 191; and Salina Cruz, 115.

In addition to the above there are four vessels in the Pacific equipped for freezing on board. There are no freezer ships in the Gulf of Mexico. The trawlers are all Diesel-powered and vary in length from 40 to 70 feet.

In addition to the trawlers there are a number of outboard and sail-powered dugouts operating on shrimp in the bays, estuaries, and lagoons where trawling is prohibited. Cast nets are used from these craft.

Shrimp vessel construction is at a standstill in Mexico. The various industry sources contacted indicated that they had no plans at this time for increasing their fleets.

Practically all Mexican shrimp are sold on consignment, consequently export prices can be calculated from United States wholesale prices. Mexican export prices would be United States wholesale prices less: (1) brokerage fee of usually 7 or 8 percent; (2) export duties and severance taxes: (a) 3.24 U.S. cents a pound from Pacific coast except Salina Cruz and Santa Rosalia, and (b) 3.31 U.S. cents a pound for Gulf of Mexico ports and the Pacific Coast ports of Salina Cruz and Santa Rosalia; (3) transportation charges: (a) 2.5 U.S. cents a pound for Guaymas, (b) 3.0 U.S. cents a pound for Gulf ports except for breaded shrimp which is 4.0 U.S. cents, (c) 4.5 U.S. cents a pound for Salina Cruz when transported across Isthmus for shipping from Puerto Mexico; and (4) loading, unloading, storage, and miscellaneous port and handling charges, 1.0 to 2.0 U.S. cents a pound.

During 1960 Mexico exported an increasing amount of peeled and deveined shrimp until at mid-year it was estimated that about 80 percent of the Carmen and Campeche exports to the United States were peeled and deveined or individually quick frozen. Since then exports of these types have declined and latest estimates run a little less than 50 percent of peeled and deveined from the Campeche-Carmen area.

Several sources have suggested that a fair average for Mexican exports to the United States during 1960 of peeled and deveined and individually quick-frozen shrimp would be 50 percent of the exports from the Gulf of Mexico and 10 to 15 percent of the exports from the Pacific. The peeled and deveined shrimp exported from the Pacific Coast have been mostly broken and seconds.

Breaded shrimp exports in 1960 also increased over 1959. It is estimated that about 2.2 million pounds of breaded shrimp were exported to the United States in 1960.

Total exports of Mexican shrimp to the United States during 1960 are expected to be larger than for 1959. It is estimated that Mexican shrimp exports to the United States during 1960 may reach or exceed 75 million pounds. However, about 1.2 million pounds of Mexican imported shrimp (mostly 16-20 count) were reported lost in a warehouse fire in Nogales, Arizona, early in November 1960. Furthermore, it is understood that Mexican export figures do not include the catches of the 5 Guatemalan trawlers that land in Salina Cruz and process their catches under bond in that free port.

Wages for regular shrimp plant laborers vary from 15-22 pesos (US\$1.20-1.76) a day. These laborers are paid for seven days a week, but they work six. They are paid double for overtime and for Sundays when they work.

Peeling and deveining is done by piecework according to the size of shrimp at so much per kilogram of shrimp meats peeled and deveined. The following rates have been reported by two Mexican shrimp-processing plants: Plant No. 1: 15-20 count, 0.4 pesos per kilo (1.45 U.S. cents a pound); 21-30 count, 0.5 pesos per kilo (1.81 U.S. cents a pound); 31-50 count, 0.5 pesos per kilo (2.18 U.S. cents a pound); and 51-65 count, 0.7 pesos a kilo (2.54 U.S. cents a pound). Plant No. 2: 30 count and under, 0.4 pesos per kilo (1.45 U.S. cents a pound); 31-50 count, 0.75 pesos a kilo (2.72 U.S. cents a pound); and 51 count and over, 1 peso per kilo (8.0 U.S. cents a pound). Good workers are reputed to make 40-50 pesos (US\$3.20-4.00) a day doing peeling and deveining.

One breeding plant has the breaders working in teams. If the team breads 4,000 pounds or less per day the rate is 0.75 U.S. cents a pound; if more than 4,000 pounds the excess is paid for at 1 U.S. cent a pound.

Mexico (Contd.)

Table 3 - Mexico's Exports of Shrimp, January-October 1960

Country of Destination	Frozen				Canned	
	Gulf of Mexico, Salina Cruz, Oaxaca and Santa Rosalia		Pacific Except Salina Cruz, and Santa Rosalia			
	Metric Tons ¹	US\$1,000	Metric Tons ¹	US\$1,000	Metric Tons ²	US\$1,000
United States	8,571.1	8,841.9	14,963.9	15,479.2	85.4	25.5
Canada	8.3	9.6	-	-	75.9	78.8
Germany	0.1	0.1	-	-	-	-
Great Britain	-	-	-	-	6.5	6.9
Total	8,579.5	8,851.6	14,963.9	15,479.2	167.8	111.2

1/Net weight.

2/Gross weight.

Note: In addition, a small amount (0.6 tons) of fresh or iced shrimp from the Gulf of Mexico and the Pacific were exported to the United States; and small amounts (0.1 tons) of dried shrimp were exported to the United States, Great Britain, and Guatemala. Values converted at rate of 12.49 pesos equal US\$1.

In the Carmen-Campeche area it is reported that an average skipper earns 3,400 pesos a month (US\$272); an average engineer 2,350 pesos (US\$188); an average winchman 1,850 pesos (US\$148); and an average cook 1,350 pesos (US\$108). An average skipper is reported to earn between 3,500 and 4,000 pesos (US\$280-320) a month at Salina Cruz and between 4,000 and 4,500 pesos (US\$320-360) from Mazatlan north. In addition to wages the fishermen are furnished food. One source reported his food costs to be 12 pesos (96 U.S. cents) per-man-per-day at Salina Cruz and 15 pesos (US\$1.20) per-man-per-day from Mazatlan north.

The seven species of shrimp comprising the bulk of the commercial shrimp catch in Mexico are all exported. They are as follows: East Coast: *Penaeus setiferus*; *P. aztecus*; and *P. duorarum*. West Coast: *Penaeus stylirostris*; *P. vannamei*; *P. californiensis*; and *P. brevivirostris*.

Mexico has the physical capacity of plants and fishing gear to produce a considerably greater quantity of shrimp than she has yet produced. A lesser number of trawlers were operating in Mexico during 1960 than during 1958 but it is estimated that the total shrimp catch for 1960 will be about 30 percent greater than for 1958. Mexico's increasing shrimp production during the past three years can be attributed to three good crop-years along the Pacific Coast and a better than usual fall-run in the Gulf of Mexico during 1960.

Mexican capacity to expand production appears to depend upon the ability of the shrimp populations to produce good annual crops of young. At present this ability seems to depend upon those factors that cause good, mediocre, or poor crop-years for young shrimp. These factors in most part are unknown but, apparently, they differ with each species of shrimp.

Of the seven species only one, *P. vannamei*, which predominates in the area between Mazatlan, Sinaloa, and San Blas, Nayarit, has been studied sufficiently to obtain some idea of one of the factors which cause fluctuations in the annual crop in that area. Conditions were such in 1960 that the production of *P. vannamei* in the area under consideration was less than half that of 1959. Nevertheless, in areas to the north the production of other species was sufficiently great to more than offset the drop in catch from the Mazatlan-San Blas area.

With current knowledge it is impossible to predict what the Mexican 1961 catch might be. However, since the bulk of the catch seems to come from summer- and fall-spawned shrimp, it is probable that production for the first five or six months of 1961 will exceed that of 1960. After that it will depend upon the success of the 1961 spawning, which is unknown.

Until further knowledge is gained concerning the factors causing good and bad years, it is futile to predict Mexico's shrimp future. The known fishing grounds are now being fished heavily to a depth of about 45 fathoms and there does not appear to be any additional grounds within this depth range in Mexico. There is some possibility of increased

catches of *P. brevivirostris* along the west coast of Mexico in depths greater than 45 fathoms but it is probable that the majority of the catch would be too small for commerce. This, however, will not be known until tried. (United States Embassy, Mexico City, November 30, 1960.)

Note: Values converted at rate of 12.49 pesos equal US\$1.



Morocco

FISH-MEAL PRICES FOR EXPORT, SEPTEMBER 1960:

Export prices for Moroccan fish meal during September 1960 varied between 35,783 and 70,000 Moroccan francs (US\$70.72-138.34 per metric ton. Average export prices for the month were 44,489 francs (\$87.92) a metric ton, or about \$79.76 a short ton.

The prices reported covered prices for export to East Germany, Spain, Singapore, France, Algeria, and Madagascar. The highest price was for exports to Madagascar and the lowest for exports to France. There is no significant domestic market in Morocco for fish meal and oil.

No fish oil was exported during September 1960. In August 1960, the export price of fish oil to France was 61,893 francs or about \$122.32 a metric ton (US\$110.97 a short ton or 5.55 U. S. cents a pound).

The only available chemical analysis of Moroccan fish meal is: water 5.7-10 per-



Morocco (Contd.):

cent; nitrates 58-70 percent; animal fats 4-11 percent; chlorides 0.61-5.26 percent; silica (SiO₂), 0.28-0.61 percent. (United States Consulate, Casablanca, December 23, 1960.)



Netherlands

ANTARCTIC WHALING OPERATIONS
AS OF JANUARY 8, 1961:

The Netherlands Whaling Company released its first interim production figures for the 1960/61 whaling season, on January 25, 1961.

Operations started on November 28, 1960. Production figures on January 8, 1961, for the company's factoryship Willem Barendsz were: whale oil 39,180 barrels (6,530 metric tons), sperm oil 1,728 barrels (288 tons), whale meat meal 1,389 tons, and frozen whale meat 509 tons.

Comparable figures for the previous season, when operations started on December

Japan. It is reported that the ship was sold for 4.4 million guilders (about US\$1,166,000). The Netherlands Whaling Company further reported that the ship sailed for Yokohama on January 2, 1961. (United States Consulate, Amsterdam, January 4, 1961.)

Note: Also see Commercial Fisheries Review, June 1960 p. 57.

CANNED SARDINE (PILCHARD) IMPORTS:

A rather small quantity of California-type pilchards or sardines is imported by the Netherlands. A substantial portion of the total imports is supplied by Japan, while imports from the United States rank second. Although imports from the United States are generally of better quality than

Table 1 - Quantity of Netherlands Imports of Canned Pilchards, 1956-59 and Jan.-Sept. 1959 and 1960

Country of Origin	Jan.-Sept. 1960	Jan.-Sept. 1959	1959	1958	1957	1956
 (1,000 Lbs.)					
Japan	172	137	212	313	203	209
United States ..	51	99	115	20	20	146
South Africa ..	143	31	37	53	126	112
South-West Africa	-	-	35	35	26	-
Other	13	22	15	9	4	24
Total	379	289	414	430	379	491

Table 2 - Value of Netherlands Imports of Canned Pilchards, 1956-59 and January-September 1959 and 1960

Country of Origin	Jan.-Sept. 1960		Jan.-Sept. 1959		1959		1958		1957		1956	
	US\$ 1,000	1,000 Guilders	US\$ 1,000	1,000 Guilders	US\$ 1,000	1,000 Guilders	US\$ 1,000	1,000 Guilders	US\$ 1,000	1,000 Guilders	US\$ 1,000	1,000 Guilders
Japan	35	133	28	106	44	164	61	232	40	153	40	154
United States ..	11	42	22	84	26	98	4	15	4	14	30	113
South Africa ..	26	99	6	21	7	26	10	36	22	85	21	80
South-West Africa	-	-	-	-	6	24	7	25	4	17	-	-
Other	3	10	5	17	3	12	2	7	1	3	5	19
Total	75	284	61	228	86	324	84	315	71	272	96	366

Note: Guilders converted at following rates: 1956 at 3.83, 1957 at 3.791, 1958 at 3.775, 1959 at 3.77, Jan.-Sept. 1959 at 3.773, and Jan.-Sept. 1960 at 3.771 guilders equal US\$1.

16, 1959, were: whale oil 30,939 barrels (5,157 tons), sperm oil 225 barrels (38 tons), meat meal 1,058 tons, and frozen meat 241 tons. (United States Embassy, The Hague, January 25, 1961.)

SALE OF WHALING FACTORYSHIP
TO JAPAN CONFIRMED:

The management of the Netherlands Whaling Company on December 29, 1960, confirmed a Tokyo report that the former Dutch whaling factoryship Bloemendaal has been bought by the Nittoh Whaling Company of

imports from Japan, the latter are lower in price. Imports from the United States have fluctuated rather widely in recent years. The sharpest drop took place in 1957 when imports dropped about 90 percent from 1956. Imports from the United States increased again substantially in 1959 when 115,000 pounds were imported as compared with 20,000 pounds in 1958, but dropped again by 50 percent in the first nine months of 1960.

Fluctuations in United States imports are caused largely by sharp changes in the catch of pilchards in California. A leading Dutch importer states that the raising of Dutch import duties on pilchards in compliance with the gradual adaptation to the common external tariff of the European Economic Community will not seriously harm the market position of pilchards. (United States Embassy, The Hague, December 5, 1960.)

Netherlands (Contd.):

FREEZER-TRAWLER STARTS FISHING:

The first Netherlands' freezer-trawler, the Egmont, has completed her trials in the North Sea and started operating in that area. Her owners claim she is the first West European trawler which can freeze its whole catch without prior processing. (Fishing News, December 16, 1960.)

SHRIMP INDUSTRY:

The Dutch shrimp fishery is conducted in the coastal waters of the Netherlands from the Prisian Islands in the north to Goeree Bank in the south. Small vessels with a crew of 2 or 3 men are used in the shrimp fishery. Shrimp caught in those waters are extremely small and fishing takes place throughout the year.

Table 1 - Dutch Landings of Shrimp, 1956-60

	1960 ^{1/}	1959	1958	1957	1956
	(1,000 Lbs.)				
Shrimp, edible	9,921	10,362	9,259	9,700	13,007
Shrimp, non-edible ^{2/}	17,637	18,519	14,771	15,873	23,148
Total	27,558	28,881	24,030	25,573	36,155
^{1/} Estimated.					
^{2/} Very small shrimp.					

The shrimp are cooked on board the vessels immediately after capture and are sold both peeled or unpeeled. The peeling of the shrimp takes place in private homes in the

Table 2 - Average Export Prices for Dutch Shrimp, 1956-59

Shrimp Product	1959	1958	1957	1956	1959	1958	1957	1956
	(Guilders a Kilogram)				(U.S. Cents a Pound)			
Unpeeled shrimp	2.61	2.61	2.63	2.05	31.4	31.3	31.5	24.3
Peeled shrimp	7.40	7.01	6.71	6.03	89.0	84.2	80.3	71.4

fishing villages. Only manual labor is used for the peeling because the shrimp are too small to allow mechanical processing. However, research has been under way for several years to find a mechanical peeling device for the small shrimp, thus far without success. Some canning plants process

shrimp, but it is of only minor importance relative to other fishery products. There are no special processing plants for the shrimp industry.

Total landings of shrimp (heads-on) in 1960 were estimated to be about 27.6 million pounds, down about 3 percent from the 1956-60 average landings.

There are 375 vessels (maximum 80 hp.) used in the shrimp industry. There is no vessel construction program, but the general tendency is to replace old vessels with vessels which have a higher-powered engine. The average engine power of old vessels varies between 20 and 40 hp., while the average hp. of new vessels is about 60.

Domestic as well as export prices fluctuate during the course of the year. They tend to decline in the spring when the supply reaches its annual peak and reach their highest level in December because of high seasonal demand. The number of shrimp per pound varies between 80 and 300. The largest shrimp are selected for export.

During the first eight months of 1960 the average domestic and export price of unpeeled shrimp was fl. 2.91 per kilogram (35 U.S. cents a pound), a 32-percent rise over the average price in the same period of 1959. It may be assumed that the average export price also tends to be substantially higher in 1960 as compared to 1959.

Both peeled and unpeeled shrimp are exported, chiefly to France and Belgium-Luxembourg.

Wage rates for peeling vary between fl. 1.25 and fl. 1.50 per kilogram (15-18 U.S. cents a pound) of peeled shrimp.

A gradual but modest increase in the shrimp catch is likely to materialize. Export opportunities are excellent because of

Table 3 - Dutch Exports of Shrimp, 1956-59

Product and Destination	Quantity				Value			
	1959	1958	1957	1956	1959	1958	1957	1956
	(1,000 Lbs.)				(US\$1,000)			
Peeled:								
Belgium-Luxembourg	1,323	1,323	1,102	882	1,220	1,139	950	522
United Kingdom	22	66	110	22	27	26	53	131
France	88	44	88	132	80	53	79	78
Total	1,433	1,433	1,300	1,036	1,327	1,218	1,082	731
Unpeeled:								
France	3,968	2,866	2,646	4,409	1,273	927	923	1,097
Belgium-Luxembourg	1,102	882	1,102	882	345	265	290	157
Total	5,070	3,748	3,748	5,291	1,618	1,192	1,213	1,254

Netherlands (Contd.):

the limited shrimp catch in French and Belgian coastal waters. The shrimp catch could be sharply increased if shrimp can be found outside coastal waters. Dutch biologists are examining this possibility. (United States Embassy, The Hague, November 29, 1960.)

Note: Values in guilders converted to U. S. dollar at following rates: 1960 and 1959, 3.770; 1958, 3.775; 1957, 3.791; and 1956, 3.830 guilders equal US\$1.



Norway

DECIDES NOT TO WITHDRAW FROM WHALING CONVENTION:

On December 29, 1960, the Norwegian Government decided against withdrawing a second time from the International Whaling Convention. The decision for continued adherence was taken in the light of moves toward a meeting of the United Kingdom, the Netherlands, Japan, and Norway in London on February 20, 1961, to try to reach agreement on an equitable distribution of whaling quotas. Confirmation that Russia was still willing to limit its catch to 20 percent of the total quota was a further favorable factor in the decision.

The Norwegian whaling industry and all the members of the Norwegian Whaling Council except its Chairman have strongly urged the Government to withdraw, since it was considered that continued adherence only accelerated the decline of the industry. The Norwegian press has reported that the industry is deeply disappointed with the decision and has quoted a leading spokesman as saying it will cost the industry about 30 million kroner (US\$4.2 million).

Norway readhered to the Convention in September 1960, but conditioned its adherence, however, on the readherence of the Netherlands and the establishment of international quotas satisfactory to Norway.

The Norwegian whaling industry opposed readherence on the grounds that the conditions should be fulfilled before, rather than after readherence. The Norwegian industry has repeatedly urged withdrawal from the Convention, asserting that the decline of the Antarctic whaling industry was being has-

tened by adherence. (United States Embassy in Oslo, December 28, 1960 and January 10, 1961.)

MARKETING OF FROZEN FISH IN EUROPEAN MARKETS TESTED:

A sample shipment of about ten tons of Norwegian frozen fish was sent to markets in France and Northern Italy to test the chain of refrigerated transport and storage facilities required to deliver the fish to the consumer in first-class condition.



The experiment, undertaken under the sponsorship of the European Productivity Agency, aims at finding the cheapest and most efficient method of transporting fish to these markets. Norwegian engineers planned to accompany the consignment on its journey by rail to North Italy and France, making tests during the trip to determine whether satisfactory standards of refrigeration are maintained. They also expect to test conditions at the refrigerated storage plants that will receive the fish, in the refrigerated vans that will distribute it, and in the deep-freeze counters from which it will be sold. (Canadian Foreign Trade, December 17, 1960.)



Pakistan

SHRIMP INDUSTRY:

Shrimp are caught in both East and West Pakistan on a commercial basis. Shrimp fishing is concentrated in the creek system of the Indus River in West Pakistan and the delta region of Brahma-Ganges in East Pakistan, particularly in the district of Khulna. Along the Mekran Coast shrimp are caught in Kalmat Bay, Soumiani Bay, Pasni Bay, Gwadar, and Ganz Shore.

The Government has done very little work to determine the extent or location of the shrimp grounds, and has only gone out to depths of 11 fathoms. However, the Government believes that the untapped resources of shrimp are great.

Pakistan (Contd.):

Although shrimp are caught throughout the year, the catch during the monsoon season is very insignificant. The bulk of the catch is from November to March in the creek system of the Indus River, from October to April on the Mekran Coast and in East Pakistan.



The shrimp freezing and canning industry is of fairly recent origin; the first shipments were exported in 1956. This infant industry has slowly developed its overseas markets.

At present, there are 3 freezing plants operating in West Pakistan all located in Karachi. The oldest of these has a freezing capacity of 5 tons per day and cold-storage space for 80 metric tons. It freezes by the blast-freezing method. Another plant has a freezing capacity of $3\frac{1}{2}$ -4 tons per day, an ice-making capacity of 33 tons per day, and cold storage space of 300-400 tons. The blast-freezing method is also used in this plant. The third plant is a new plant, which went into operation in 1960. It has a blast-freezing capacity of 10-15 tons per day and plate freezing of 5 tons, and can produce 10-15 tons of ice daily. The cold-storage capacity is 250-300 tons.

Besides the freezing plants in Karachi, there is one canning plant. It has a capacity of 5,000 cans ($3\frac{1}{2}$ -5 oz.) per day.

For the Karachi area the Government has sanctioned 4 additional freezing plants, 2 canning plants, and 1 combination freezing and canning plant. The sanctions have been based on value and not on plant capacity, so that the production potential can not be gauged. In addition to these sanctions already granted, the Government has under consideration another proposal for location in Karachi in which United States capital investment would be involved.

In East Pakistan only 1 freezing plant is in operation. This plant has a 5-ton-a-day freezing capacity. In East Pakistan the Government has sanctioned 4 additional plants. The sanctions are also based on monetary value of plants rather than freezing capacity. Consideration is also being given to a proposal for another plant in East Pakistan. This too involves possible United States investment.

The Government has plans for 3 freezing units to be located on the Mekran Coast, but the sanctions have not yet been given.

Peeling and deveining of the shrimp is done by hand. Sorting by sizes, as well as freezing and actual canning is mechanized. Because of labor costs it is not anticipated that peeling and deveining processes will be mechanized in the near future.

Landings of shrimp (heads-on) for the years 1956-59 were as follows: 1959, 27.0 million pounds; 1958, 32.0 million pounds; 1957, 34.6 million pounds; and 1956, 25.1 million pounds.

The mechanized fishing vessels in West Pakistan totaled 153 in 1960 and in East Pakistan number 19. These vessels are not all involved in shrimp fishing. In West Pakistan, private industry saw in the shrimp industry a field in which it believed large profits could be made supplying raw shrimp for processing. A number of private investors undertook construction of shrimp trawlers. Operating out of the port of Karachi there are 39 trawlers devoted exclusively to shrimp. These range from vessels the smallest of about 20 feet long, a beam of 5 feet, a depth of 2 feet, and a tonnage of less than 2 to a large one measuring 82 feet in length, a beam of 22 feet, a depth of 12 feet, and tonnage of about 133. In addition to these vessels there are between 30 and 40 improvised beam trawlers operating.

The response by the private investor has been so great that if trawler construction con-

Pakistan (Contd.):

times at the present rate there will be an oversupply of raw shrimp which can not be absorbed by the shore installations. For this reason the Government at the present time is discouraging the construction of additional trawlers until such time as the new shore plants are in operation. The Government is encouraging the trawler operators to outfit their trawlers with gill nets so that they may be used for fishing other than shrimp.

All of the trawlers at present are owned by private investors of Pakistani nationality with the exception of 2 trawlers which are the property of the Central Fisheries Department, Government of Pakistan.

Frozen shrimp (heads-off) are exported to the United States in the following packs (all five-pound cartons): 10-15 a pound, 36-40 a pound, and 51-60 a pound. The largest percentage of the shipments consist of 36-40 count per pound. One freezing plant stated that the average price of all types of frozen shrimp to the United States, f.o.b. Karachi, was 53 U.S. cents a pound. The plant, also stated that the average price per pound for 10-15 count shrimp was 71 cents and for the 51-60 count shrimp was 35 cents; no price was available for the 36-40 count shrimp, the most popular size shipped to the United States.

Based on the statistics of exports, the following average prices f.o.b. Karachi were calculated: January-June 1960, 38 U. S. cents a pound; 1959, 53 cents a pound; 1958, 45 cents a pound; 1957, 53 cents a pound; and 1956, 37 cents a pound.

be said there are no subsidies, exporters of processed shrimp are entitled to export bonus vouchers. For the canned and frozen shrimp the exporter is entitled to a voucher authorizing him to use 40 percent of the foreign exchange earned for the import of items which can be selected from a list of over 200 products. These vouchers can be sold in the open market where the premium is currently around 130 percent of face value. Hence there is an element of subsidy. If dried shrimp is exported, the voucher entitlement is 20 percent.

In the processing plants (freezing and canning) the workers employed in shelling and deveining are paid on the basis of 3 rupees 8 annas (about 74 U. S. cents) per maund (82.3 pounds) of unshelled shrimp. Those working on the freezers and canning equipment are considered semiskilled workers and are paid 3 rupees (about 64 U. S. cents) per 8-hour shift in the day time and 4 rupees (about 85 U.S. cents) per 8-hour shift at night time.

Although some of the fishermen are paid on a share basis, this is not the usual method. It is customary to employ the crew on a salary, food, and bonus basis. Rates of monthly pay are as follows: Captain, Rs. 600 (about US\$127); Mate, Rs. 300 (about US\$64); Engineer, Rs. 200 (about US\$42); and Crew member, including cook, Rs. 150 (about US\$32). The bonus per crew member for a good catch may amount to US\$6-8 per month.

Very few trawlers, in fact, have persons holding a captain's license. The senior officer usually is one holding a mate's rating. On vessels up to 60 tons the normal complement is 6 to 9 persons; those of larger size number 9 to 13, but there is only 1 trawler that carries a crew of 13.

Table 1 - Pakistan's Exports of Processed Shrimp, 1956-59 and January-June 1960

	Frozen Shrimp ^{1/}			Dried Shrimp ^{2/}			Canned Shrimp ^{3/}		
	Quantity	Value		Quantity	Value		Quantity	Value	
	1,000 Lbs.	Rs. 1,000	US\$1,000	1,000 Lbs.	Rs. 1,000	US\$1,000	1,000 Lbs.	Rs. 1,000	US\$1,000
Jan.-June 1960 . .	472	838	188	-	-	-	23	126	27
1959	761	1,908	404	785	1,142	242	80	686	145
1958	726	1,531	324	901	1,287	273	66	350	74
1957	754	1,868	396	177	296	63	-	-	-
1956	136	240	51	723	465	99	-	-	-

^{1/}All exports of frozen shrimp were made to the United States.

^{2/}Exports mostly to Burma, Hong Kong, Kuwait, and South Africa.

^{3/}Practically all exports of canned shrimp made to United Kingdom.

Note: Rupees converted at rate of 4.72 Rs. equal US\$1.

The exporters of frozen, canned, and dried shrimp are required to obtain an export license. This is *pro forma* and all licenses are granted. There are no export taxes on shrimp. While technically it may

During the monsoon season when the trawlers are not operating, the owner keeps the mate (or captain) and the engineer on half pay for the months of June, July, and August.

Pakistan (Contd.):

Central Fisheries Department, Government of Pakistan, estimates that the annual income of the ordinary fisherman is probably in the neighborhood of Rs. 1,600 to Rs. 1,750 (US\$339-371) including bonuses, but excluding the value of food received.

Although information is lacking on the extent of the shrimp stocks, it is believed that the resources are extensive. Accordingly it seems possible that the annual catch of shrimp could physically be expanded. However, it is not expected that increased production in frozen shrimp, which is normally shipped only to the United States, will be possible until new shrimp-freezing plants are established in Pakistan.

The single shrimp-canning company has shown little interest in entering the United States market since its markets in other countries absorb its production.

If the trawler fleet continues to increase and is capable only of shrimp fishing, then the only possible outlet for the catch would be for dried shrimp until such time as other processing facilities are constructed. (United States Embassy, Karachi, December 12, 1960.)



Peru

AVERAGE EXPORT PRICES FOR FISH MEAL:

November 1960: The Peruvian National Fisheries Society--the trade organization for the fisheries industry--reported in December 1960 that the average export price for fish meal (65-67 percent protein) during November 1960 was about US\$60 a metric ton (US\$54.43 a short ton). Average prices for all fish meal exported in November (including fish meal contracted for at higher prices prior to November) was US\$75 a metric ton or about US\$68.04 a short ton.

The domestic price for fish meal is about the same as the export price for the same quality meal. However, as a rule the fish meal sold on the domestic market is much lower in quality and is made from waste rather than from whole fish.

December 1960: The Peruvian National Fisheries Society--trade organization for

the fisheries industry--reported in January 1961 that the average export price for fish meal (65-67 percent protein) during December 1960 was US\$61 a metric ton (US\$55.34 a short ton). (United States Embassy in Lima, December 21, 1960 and January 19, 1961.)

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EXPANSION OF FISH-MEAL INDUSTRY
CREATES WORLD PROBLEM:

The sudden, even explosive development of anchoveta fishing off the coast of Peru--which can serve as both an inspiration and a warning to countries seeking to develop fishery resources--has had worldwide repercussions, according to an FAO spokesman.

Up to ten years ago the Peruvians caught less than 50,000 metric tons of fish a year. In 1959 they caught about 2 million tons, of which anchoveta and similar species accounted for 1.8 million tons. Almost all the Peruvian catch of anchoveta is used to make fish meal.

This dramatic development has brought with it complications and problems.

The Peru Current, which flows northward along the Peruvian coast, is immensely rich in aquatic resources, including anchoveta, bonito, whales, dolphins, and seals, and supports huge flocks of guano birds. But, rich as these resources are, they may not be able to stand up to the present rate of exploitation, particularly if the traditional guano bird population is to be maintained.

This represented one of the main problems which had arisen because of the intensity of fishing. The other was concerned with the fish-meal industry.

When fishing for anchoveta was started on a large scale a few years ago, the conditions were such that the fish-meal manufacturers were able to make fortunes very quickly. They had no difficulty in obtaining the raw materials--anchoveta--as boats could go out twice a day and come back loaded with fish. So, in view of the abundance of raw material, low operating costs, and other favorable factors, the fish-meal industry in Peru expanded rapidly, much of it financed by loans from banks and other private sources. Almost all the fish-meal production was sold to the export market, but when such large quantities became available the price for fish meal fell drastically from about \$130 a metric ton to its present level of about \$75 a ton. This drop has had widespread repercussions not only on the Peruvian industry but also on the fish-meal industry throughout the world.

Some idea of the importance assumed by the fishing industry to Peru is gained by the fact that marine products now contribute more than 3 percent of the gross national income and account for about 7 percent of Peruvian exports. At the same time, it provides employment for more than 27,000 people.

Linked with this problem of the expanding fishing industry is the problem of guano production.

The guano birds feed on the anchoveta and it is estimated that the birds eat at least 4 million tons of this fish per year. The population of these birds fluctuates from about 30 million to 10 million but no one knows why. Some people believe the birds die off when the stocks of fish fail or decline, while others contend that the birds die because they are infected by parasites or some other form of disease, but it does seem true that the birds can only exist in great numbers if fish are there for them to feed on.

And there is no doubt that guano, which is the droppings of these birds, is of great importance to the farmers in Peru. About 6½ million tons of guano are collected each year and of

Peru (Contd.):

this only a little over a million tons are exported. The rest is sold at a cheap price to Peruvian farmers as a kind of subsidy.

The Peruvian Government has been, naturally, much concerned as to the effects of heavy fishing of anchoveta stocks and, indeed, for a time prohibited new fish-meal plants.

The rapidly rising production of fish meal and the drastic fall in market price have aroused concern among both Governments and the industry about future developments. FAO has been asked by Governments and by the fish-meal industry in various countries to call a meeting to consider what can be done to ensure a stable future for the industry. The present situation has reduced output in a number of countries, affecting the incomes of fishermen and others concerned with the industry. The meeting will be attended by Government representatives, accompanied by advisers from their fish-meal industries. It will attempt to assess the world demand for fish meal and to consider ways and means of increasing effective demand.

The situation resulting from the sudden development of the Peruvian fishing industry in one direction only provides a very good example of the kind of danger inherent in unplanned and unbalanced exploitation of natural resources.

It is an example which should be studied carefully by many countries now seeking to develop their natural resources, whether in fisheries, forestry, or in other fields. It calls attention once again to the fact that such countries need a balanced development program so that progress made in one sector of an industry should not have an adverse effect on other sectors. A proper balance is particularly needed between primary production on the one hand and the marketing and use of the product on the other. The lack of such balance can completely frustrate the objective of development and, moreover, as in the case of Peru, be damaging on an international scale.

* * * * *

FISH MEAL EXPORTS LIMITED TO 600,000 TONS IN 1961:

The Government of Peru has responded to a request by Peruvian producers of fish meal for governmental measures to aid the industry, whose exports during the first nine months of 1960 reached 383,600 metric tons, valued at 850.2 million soles (US\$30.8 million), 10 percent of the value of Peru's total exports for that period. According to the President of the National Fisheries Society (Sociedad Nacional de Pesquería), the trade organization of the Peruvian industry, governmental action was deemed necessary to save it from "imminent paralysis" as a result of the continued decline in the world market price, which is now said to be below the cost of production.

Through the Society and other channels, the industry has been endeavoring, without success, to find ways of regulating production or exports of fish meal through voluntary action. For the first time, all Peruvian fish-meal producers and exporters will now be working together to that end because, under a recently-issued decree, prior approval by the Society will be required before export licenses will be granted by Peru's Bureau of Fish and Wildlife, Ministry of Agriculture.

At a meeting of principal world fish-meal producers held in Paris in October 1960, where Peru was represented by observers only, it was determined that world fish-meal exports in 1961 would be approximately one million metric tons. As the world's largest producer and exporter of fish meal, Peru's suggested allocation was 60 percent, or 600,000 metric tons, a figure which proved to be acceptable to the Peruvian industry. Although the Government of Peru adheres to the policy of free enterprise and has heretofore refused to depart from it, on behalf of the fish-meal industry, it has been

persuaded to institute controls in response to the industry's request. In doing so, the Government has taken into account not only the situation of the industry itself and unfavorable repercussions of the situation upon the economy of the country as a whole, but also the necessity of conserving natural resources. Therefore, the Government officially ratified the agreement reached at the Paris meeting, and has given the force of law to the export quota of 600,000 metric tons for 1961. This has been accomplished by the issuance of Supreme Decree No. 18, dated December 16, 1960 (published in *El Peruano* of December 20).

The General Manager of the National Fisheries Society reports that the Society has worked out a formula for determining individual export quotas for Peruvian producers for the first quarter of 1961, within the 600,000 metric ton annual quota established at the Paris meeting. A number of factors have been used in determining them, including stocks as of October 31, production during November and December (seasonally good months for anchovy fishing), respective capacities of each plant as determined by the Society earlier in the year, historical sales patterns, and future contracts. Individual quotas are to be adjusted quarterly, in accordance with performance. The system began to function January 1, 1961, and all producers are included in it, since approval of the Society will be prerequisite for obtaining export licenses.

The Society proposes to be in constant touch with the Central Committee of Fish Meal Exporters, being formed in London as a result of the Paris meeting, to be the focal point for all fish-meal marketing information, and it will assure that all shipments from Peru are made in accordance with the quota. Decisions of the Central Committee are to be made by vote based upon quota. It is understood that Peru, entitled to 60 out of the total 100 votes, renounced ten on condition that 51 votes should constitute a majority. In these circumstances, Peruvian producers are in a position to dominate the Committee's decisions.

Concurrently with the establishment of the export quota, Peruvian fish-meal producers have been organizing a marketing organization called "Consorcio Pesquero del Peru, S. A.," a cooperative corporation to which approximately 93 percent of all Peruvian producers belong. Only one major producing company, with three fish-meal plants, has not become a member. The purpose of the organization is to enable producers, some of whom operate with very limited capital, to withstand price speculation and manipulation by working together, and thus to provide for a more orderly marketing of Peruvian fish meal. It was anticipated that the Consortium would be in operation about mid-January.

According to information available, the Consortium will sign an enforceable contract with each of its members to sell only through the cooperative, and brokers will no longer purchase fish meal from individual producers, but from the organization. Procedures are not yet known, but it is possible that already well established sales channels will be used.

The Consortium contemplates the necessity of establishing a price stabilization fund in order to support prices when, because of unreasonable purchase offers, it becomes necessary to prohibit sales and to finance producers with limited capital who must sell in order to stay in business.

Peru's annual fish-meal exports have not yet reached the 600,000-metric-ton level established by the quota. However, the successful operation of the system should, by placing a known limit on Peruvian exports, help to stabilize the Peruvian industry and, considering Peru's dominant position as primary world producer, the world situation also. This would come about because the quota may be expected to put a floor under prices, help to maintain the level of prices, and avoid speculation and sudden price changes. While Peruvian producers have never before found a formula for working together for their mutual welfare, they appear to have made a good start by accepting the Paris agreement and in the setting up of the Consortium.

Peru (Contd.):

Through increased revenue from export taxes, the Government of Peru should also gain from any improvement in the export price of fish meal. Since export taxes are based upon the difference between an officially established production cost figure and actual selling prices, which have been lower than the cost figure in recent months, the Government has been receiving little, if any, revenue from that source.

The Decree which gives the force of law to Peru's export quota of 600,000 metric tons may be summarized as follows:

Preamble: The sea and fish therein are natural resources belonging to the State, which is responsible for conservation and supervision required to protect the living resources of the sea; the accelerated growth of the fish-meal industry, requiring ever increasing quantities of raw fish (anchovy or anchoveta), makes conservation and supervisory measures necessary until such time as hydrobiological studies now being made shall provide a definite basis for regulating the industry; increased Peruvian production and exportation of fish meal has caused the decline of the world price of the product, endangering the stability of the industry and related activities; fish-meal producers from principal exporting countries have entered into the Paris Agreement of October 1 providing for regulation of the international market through the establishment of flexible quotas, and this agreement has been approved by the National Fisheries Society; approval of the Paris agreement is in the national interest, since it should serve to improve the price of fish meal, benefiting the industry and the Government. Therefore it is decreed:

Art. 1. The Paris Agreement of October 1, 1960, reached by fish-meal producers of principal exporting countries and adopted by the National Fisheries Society, is approved.

Art. 2. For three years from January 1, 1961, the exportation of fish meal is prohibited in quantities exceeding the limit established in accordance with the system of export regulation adopted by the National Fisheries Society in order to comply with the Paris Agreement, which established a quota for 1961 of 600,000 metric tons, subject to variations that may be established in subsequent agreements.

Art. 3. The National Fisheries Society is authorized to enforce strict compliance with the system of quotas approved at the General Meeting held on October 26, 1960.

Art. 4. Export licenses for fish meal will be without value unless authorized by the Bureau of Fish and Wildlife of the Ministry of Agriculture, which will not issue such authorization unless the license has been approved by the National Fisheries Society in accordance with the export system adopted by the Society and approved by this Decree. Peruvian Customs officials will not issue fish-meal export policies when the respective license fails to comply with the two requisites indicated in this Article, as well as with legal requirements and regulations.

Art. 5. The National Fisheries Society will immediately undertake to make a general inspection of actual conditions in the fish-meal industry at all establishments along the coast of Peru, to determine in detail the number, location, class, volume of production, and condition of the companies established, the resulting information to be presented to the Government within a period of 90 days, considering also the regularization of stocks. The Bureau of Fish and Wildlife and political, fiscal, and maritime authorities will provide all necessary facilities to assist the Society in this mission.

Art. 6. No license for the manufacture of fish meal shall be issued by the Ministry of Agriculture without appropriate reports from the Ministry of Marine, the Council of Hydrobiological Investigations, the Industrial Bank of Peru, and the National Fisheries Society, with prior consideration in each case of compliance with legal requirements and corresponding regulations, and of the national interest.

Art. 7. The same requirements apply in cases of modification of the license to expand production capacity.

Art. 8. Each company which, in accordance with the report of the National Fisheries Association referred to in Article 5 is not in a position to produce immediately, shall revalidate the license it holds pursuant to the requirements set forth in Articles 6 and 7 above.

Art. 9. The present decree and limitations established in it shall remain in effect until abrogated by new Executive action, on the termination of the economic and hydrobiological studies now being made regarding fisheries, and the industrialization of anchovy. No permit, receipt, document or instrument of any kind may be issued by authorities which might have the effect of evading or impairing the limitations established by this Decree.

Art. 10. Insofar as they are not modified by the present Decree, the provisions of Supreme Decree No. 9 of the Ministry of Agriculture, dated October 9, 1959, and other pertinent dispositions remain in full effect.

Art. 11. This Decree is to be countersigned by the Ministers of Foreign Affairs, Finance, Marine and Agriculture. (United States Embassy, Lima, December 20, 1960.)



Philippine Republic

SHRIMP INDUSTRY:

There are no commercial vessels in the Philippines that fish exclusively for shrimp. Shrimp make up part of the regular catch.

Table 1 - Philippine Shrimp Production, 1956-59^{1/2}

Year	By Vessels Over Three Gross Tons	Total Production ^{2/}
	(Metric Tons)	
1959	4,485	14,000
1958	4,067	13,000
1957	2,492	9,000
1956	3,702	12,000

^{1/} Heads-on weight.

^{2/} Estimated.

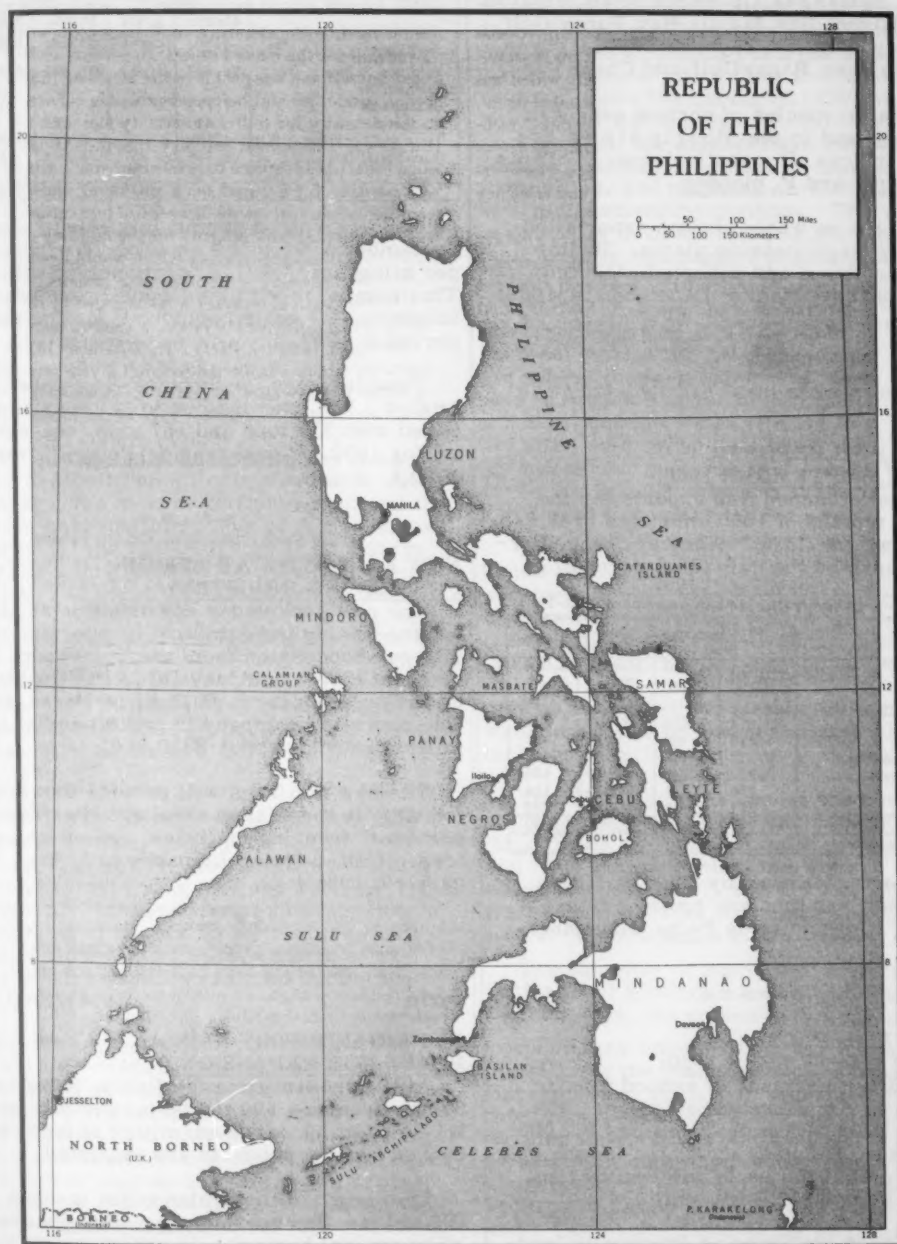
No shrimp fishing ground, as such, has been discovered, but the Bureau of Fisheries is attempting to find the shrimp-breeding grounds. Shrimp are caught in the following fishing grounds where they are available throughout

Table 2 - Philippine Exports of Shrimp Paste, 1956-1959

Year	Country of Destination	Quantity	Value
		Pounds	US\$
1959:	Continental United States	7,769	1,786
	Guam	3,232	700
	Hawaii	1,631	279
	Total	12,632	2,765
1958:	Continental United States	1,102	504
	Guam	4,409	444
	Hawaii	4,502	549
	Total	10,013	1,497
1957:	Continental United States	11,173	1,676
	Guam	459	90
	Hawaii	7,385	673
	Total	19,017	2,839
1956:	Continental United States	4,634	950
	Guam	2,156	301
	Hawaii	-	-
	Total	6,790	1,251

Note: Values converted at rate of 2.004 pesos equal US\$1.

Philippine Republic (Contd.):



Philippine Republic (Contd.):

the year: Samar Sea, Guimaras Strait, Visayan Sea, San Miguel Bay, Manila Bay, Panay Gulf, Bacuit Bay, Sulu Sea, Tayabas Bay, Lingayen Gulf, Cuyo Pass, Ragay Gulf, and Coron Pass.

The major species of shrimp caught in waters adjacent to the Philippines are *Penaeus indicus*, *P. canaliculatus*, *P. affinis*, *P. incispes*, and *P. mondon*.

There are no whole shrimp exports, nor whole shrimp-processing plants. Shrimp paste is produced and exported. (United States Embassy, Manila, December 14, 1960)



Portugal

CANNED FISH EXPORTS,
JANUARY-SEPTEMBER 1960:

Portugal's canned fish exports for the first nine months of 1960 amounted to 42,648 metric tons, or 2,336,000 actual cases. Sardines comprised the bulk (83.6 percent) of

Portuguese Canned Fish Exports, January-September 1959-1960

Product	January-September			
	1960		1959	
	Metric Tons	1,000 Cases	Metric Tons	1,000 Cases
In Oil or Sauce:				
Sardines	35,654	1,876	38,789	2,011
Chinchards	1,135	60	1/	-
Tuna and tunalike . .	2,318	83	3,200	114
Anchovy fillets . . .	2,920	291	4,870	486
Mackerel	378	14	2,909	116
Others	243	12	2,036	103
Total	42,648	2,336	51,804	2,830

1/Probably included in "Others."

those exports, followed by anchovy fillets (6.8 percent) and tuna and tunalike fish (5.4 percent). (*Conservas de Peixe*, November 1960.)

CANNED FISH PACK,
JANUARY-SEPTEMBER 1960:

The Portuguese pack of canned fish, in oil or sauce, for January-September 1960 amounted to 36,593 metric tons or 1,972,000 actual cases. Sardines accounted for the bulk (72.9 percent) of the pack, followed by tuna and tunalike fish (12.4 percent).

Matasinhos continued as Portugal's leading sardine port. The average ex-vessel

Portuguese Canned Fish Pack, January-September 1959-1960

Product	January-September			
	1960		1959	
	Metric Tons	1,000 Cases	Metric Tons	1,000 Cases
In Oil or Sauce:				
Sardines	26,677	1,404	26,932	1,417
Sardinelike	-	-	544	28
Chinchards	1,770	94	-	-
Mackerel	410	16	533	21
Tuna and tunalike . .	4,525	162	4,065	145
Anchovy fillets	2,666	267	4,343	434
Others	545	29	1,081	57
Total	36,593	1,972	37,498	2,102

price for sardines during July, August, and September 1960 was 3 escudos 73 centavos per kilogram (5.9 U. S. cents per pound). This compares with 3 escudos 1 centavo per kilogram (4.7 cents per pound) for the same period in 1959.

Tuna landings for January-September 1960 totaled 1,909 tons and bonito 110 tons as compared with 377 tons and 187 tons, respectively, for 1959. (*Conservas de Peixe*, November 1960.)

NEW FACILITIES AT LISBON
FOR FISHING INDUSTRY:

The new dock under construction at Lisbon for the fishing industry will be operated on a 25-year concession from the Portuguese Government by the company DOCAPESCA (Sociedade Concessionaria da Doc de Pesca, Sarl). The operating company is capitalized at 10 million escudos (about \$350,000).

The new facilities will provide the fishing industry in the Lisbon area with distribution services, freezing facilities, and other services. (United States Embassy in Lisbon, January 19, 1961.)



Syria

FISHING INDUSTRY AND
PLANS FOR EXPANSION:

At the present time the fishing industry in Syria produces 500 to 700 metric tons yearly. In addition, large quantities of fresh and canned fishery products are imported.

The length of the Syrian coast is about 109 miles. The coast is open to gales and lacks natural harbors. In recent years, the coastal fisheries have produced from 300 to

Syria (Contd.):

500 tons of fish. There are more than 1,243 miles of rivers in Syria, plus the equivalent of 50 square miles in lakes and other water sources, producing about 200 tons of fish annually.

Around the Island of Arwad and in the regional waters of the United Arab Republic and the Lebanese Republic there are sponge resources. In normal years, the average production is 3 tons. The season is between June 1 to September 30. In 1958, production reached 5 tons which resulted in depletion, as the increase was made up of the small and cheap sponges. About 20 to 25 medium-size vessels equipped with Diesel engines and diving equipment are engaged in sponge fishing. There are still a number of sponge fishermen who prefer free diving.

The landings of fishery products in the Syrian Region is small compared with water resources, the number of fishermen, and the need for consumption. This is due to several factors: (1) the use of dynamite on a large scale for a long period; (2) the drainage of the Ghab and the expansion of irrigation; and (3) lack of modern fisheries equipment, technique, and poor marketing methods. The income of a fisherman is £S. 800 to £S. 1,000 (US\$223-279) per year in return for 6 to 8 months' work, which is the lowest income of an unskilled laborer in Syria and below the essential needs of a worker's family of 5 persons.

A program for improving the fisheries aims at continuing research for fish resources, fish culture, exploitation, training fishermen, marketing fish and sponges, the formation of cooperatives, and expansion in the building of basins. This requires large sums of money and a large amount of exports which cannot be realized during the next five years.

The Fisheries Institute planned for Latakia will conduct research on resources of marine fish, and on the best methods for fishing, storing, distribution, and marketing. It will consist of a building for the administration and laboratories, and a hall for a collection of marine animals. The project requires £S. 215,000 (US\$60,000) as investment and £S. 21,000 (US\$5,866) for operating expenses.

Due to the decline of fish production from 1,000 to 200 tons annually from fresh-water rivers and lakes as a result of irrigation and dams, the Major Projects Institute has established in the al-Madiq Fortress area ponds for fish culture with a view to improving production. Since the spring of 1959, when the Ministry of Agriculture started these pond experiments, the studies have indicated production possibilities, but this fish farm is far from cities, and requires on-the-spot observation and scientific methods. Therefore, it is essential in order to complete the experiment to have buildings, equipment, and a sufficient number of workers. Necessary investments for the project are estimated at £S. 85,000 (US\$23,743) and operating expenses of £S. 244,000 (US\$68,156).

The Butayhah fish farm aims at exploiting the stream waters entering the Lake of Tiberiad and gathered in the lowlands situated east of the bank between the two gulfs of Mas'adeh and Zakiyah, lands unfit for other exploitations.

The area planned for basins is about 10 hectares (24.7 acres). The construction costs will be about £S. 150,000 (US\$41,900). The expenses of operations will be £S. 5,000 (US\$1,397) annually. The annual production is estimated at 25 tons of carp and mabruk fish, valued at £S. 35,000 (US\$9,777). The private sector will undertake this project to which the Ministry of Agriculture will give technical services with its present machinery.

The Ghab project includes the establishment of three farms for fish raising in artificial lakes at 'Ayn al-Taqa, al-Hawwash, and 'Ayn al-Na'ur, the total area of which is about 750 hectares (1,853 acres). The Ministry of Public Works will undertake the execution of this project.

The Ministry of Agriculture will stock the Qatinah and Mas'adah Lakes and other rivers in Syria with fish raised in fish culture ponds.

Fisheries cooperatives are planned to consolidate the productive capacities of the fishermen and their gear with the aid of equipment, marketing, and financing. It has been decided to form five cooperatives, one in Latakia including Banias and Tartus, a sponge cooperative in Arwad, a fishery cooperative in Qatinah Lake including the Orontes Valley, and a fish cooperative in the Euphrates Valley including the Khabur.

Syria (Contd.):

The cooperatives will be financed by short-term loans not exceeding one year, and long-term loans not exceeding 5 years, from credit facilities extended by the Agricultural Bank.

Necessary investment for the fisheries cooperative program is estimated at about L.S. 1,075,000 (US\$300,270), and current development expenses amounting to L.S. 48,000 (US\$13,408). (United States Embassy in Damascus, December 3, 1960.)



Turkey

SHRIMP INDUSTRY OF SOUTHERN TURKEY:

Iskenderun is the center of the shrimp industry for southern Turkey. The main shrimp grounds are located in the Gulf of Iskenderun and off the coast of Mersin-Karatas-Yumurtalik. Exploration for shrimp in offshore waters has not been undertaken as equipment is not adequate, and knowledge is limited.



Shrimp vessels fish from mid-October until April. During winter, shrimp are in fairly good supply on the local market. In summer, the Government-run EBK-Meat and Fish Combine has some frozen shrimp available, in 2-kg. (4.4 pound) packages.

The only processing plant in the area is the freezing plant of EBK. Mechanization is limited; the shrimp are headed by hand, then frozen in cartons. Further processing is not contemplated.

Estimated total annual shrimp landings for Iskenderun vary from 60 tons for a good year (1957), to 40 tons for a bad year (1959).

As of December 1960, there were 26 Diesel-powered boats averaging 30 ft. in

Table 1 - Annual Average Export Prices for Heads-Off Shrimp F.O.B. Iskenderun, Turkey, 1958-60

Year	Fresh	Frozen	
		Small	Large
1960	750-800	600-650	1,100-1,200
1959	680-700	500	800
1958	665-700	-	-

length operating out of Iskenderun, and two from Mersin. These boats are designed for general trawling, and all but one (a 50-ft. steel trawler) was built locally. Local vessels are not equipped with freezing facilities. Future expansion of the fleet is not anticipated. Iskenderun fishing boats are owned locally.

Table 2 - Turkish Shrimp Exports, 1956-1960

Year	Destination	Fresh		Frozen	
		Metric Tons	US\$	Metric Tons	US\$
1960	Lebanon	18	12,904	-	-
(Jan.-Oct.)	Syria	19	14,180	-	-
1959:	United States	-	-	2	1,325
	West Germany	-	-	2	1,590
	Syria	20	13,990	-	-
	Lebanon	8	5,541	-	-
1958:	United States	-	-	2	3,330
	Syria	19	17,972	-	-
	Lebanon	9	9,640	-	-
1957:	(Not available)	-	-	-	-
1956:	United States	-	-	3	3,650
	Lebanon	38	20,187	-	-
	Syria	4	2,089	-	-

There are no skilled workers in the shrimp processing industry. Unskilled labor in shrimp-freezing plants receive approximately 25-30 U. S. cents per hour.

Iskenderun fishermen receive a salary which ranges from about US\$33 per month for unskilled men to about US\$133 per month for the captains and mechanics. Wages are paid only during the fishing season--October-May.

There is little possibility of expanding the annual local catch of shrimp with the equipment used. It was stated that the shrimping grounds are in danger of being fished out unless control is exercised, either through stricter governmental controls or on a voluntary basis.

There are two sizes of shrimp caught--7-8 and 15-20 count (heads-on). An appreciable expansion of Iskenderun exports of shrimp to the United States is not likely. (United States Consulate, Iskenderun, December 12, 1960.)



Union of South Africa

FISH-MEAL INDUSTRY LOWERS RAW FISH PRICE:

As an economy measure, the South African fish-meal industry has adopted a reduced price per ton of raw fish, which has been accepted by private vessel owners. Privately-owned vessels account for an estimated one-third of the South African catch.

Wages or shares paid to the crews of company vessels have also been cut. Exact figures are not available but it is believed that company-vessel crews now receive about £2 (US\$5.60) per ton (down from £2.12 (US\$7.28)). Private vessel owners are believed to have accepted a 20-percent price cut and a loss of fuel allowances and bonuses. In the redistribution of wages on privately-owned vessels, the captains have taken a maximum of nearly a 50-percent cut in pay.

Captains of privately-owned vessels have been earning up to £4,000 (US\$11,200) for seven months' work, four times a crewman's wage. The industry felt it could not support this in view of depressed fish-meal prices. (United States Embassy, Pretoria, December 29, 1960.)

PERU INTERESTED IN PURCHASING FISHING VESSELS:

The Honorary Consul of Peru in Cape Town, Union of South Africa, has asked a Cape Town firm of naval architects for plans and estimates for the design and construction of steel-hulled, bare-bottom carriers for the Peruvian fishing industry. Seventy-foot steel pilchard vessels built in South Africa suit the Peruvian specifications. Some have already been built for the South African fishing industry. Present capital costs for these vessels are estimated at £310 (US\$868) per foot of length, or about £21,700 (US\$60,760) for a 70-foot vessel with fishing gear and engines installed.

It is understood that the Peruvians have purchased similar vessels from American shipyards in the past, but are interested in South Africa as a lower-priced supplier. South African labor and steel are understood to be significantly lower. (United States Embassy, Pretoria, December 29, 1960.)

TUNA FISHERY INITIATED:

Three of the leading companies in the South African fishing industry initiated a joint tuna-fishing venture in January 1961. The joint effort calls for the use of five pilchard (sardine) vessels which normally operate out of South-West Africa's Walvis Bay during the pilchard fishing season. Plans call for the vessels to fish for tuna off South Africa's Western Cape from January-April. A separate tuna fishing company may be formed by the group at a later date.

The three companies involved are interested in the United States market for frozen tuna and expect to be able to compete with Japanese selling prices, the United States Consul in Cape Town reported on January 11, 1961.



U.S.S.R.

FISHERY ATLAS ISSUED FOR NORWEGIAN AND GREENLAND SEAS:

Soviet scientists have prepared a fishery atlas for the Norwegian Sea and the Greenland Sea, according to the December 28, 1960, issue of *Fiskaren*, a Norwegian fishery trade periodical. The atlas contains 150 charts with details on the fishery importance of the areas, fishery statistics, herring biology, and information on fluctuations in the fishery stocks, etc.

NEW FACTORYSHIP TRAWLER TO FISH IN THE NORTHWEST ATLANTIC:

A new factoryship trawler *Angaretis* has been turned over to the Lithuanian base for fisheries, according to the November 15, 1960, issue of *Sovjetskaja Litva*. In addition to refrigerated space, the vessel has equipment for canning cod livers, refining oil for technical use, and producing meal. The vessel was built in Nikolaev. It will lead the next Klaipeda fleet's expedition to the Canadian coast. (*Fiskets Gang*, December 8, 1960.)



United Kingdom

FISH MEAL PRICES, JANUARY 1961:

Fish-meal prices reported by a British trade periodical between November 19, 1960, and January 7, 1961, were as follows:

Type of Fish Meal	Protein Content	Date Quoted	L/s. Per Long Ton	Long Ton	Short Ton
South Africa (white fish)	65	11/19/60	48/15	136.50	121.87
Peru (branded)	65	1/ 7/61	36/0	100.80	90.00
Peru (average quality)	65	1/ 7/61	31/10	88.20	78.75
Iceland (white cod)	70-73	11/26/60	42/0-48/16	117.60-136.64	105.00-122.00
Iceland (herring)	70	1/ 7/61	43/15	122.50	109.37
Denmark (herring)	73	11/26/60	45/12	127.65	114.00
Domestic (white fish)	66	1/ 7/61	56/10	158.20	141.25
Domestic (herring)	68-71	1/ 7/61	50/0	140.00	125.00

Note: Imported fish-meal prices are c.i.f. current shipment, and domestic-meal prices (net cash) are ex-plant in 6 long-ton lots and bagged.

(United States Embassy, London, January 9, 1961.)

SURVEY OF INSHORE FISHERMEN'S EARNINGS, 1959:

British inshore fishermen landed about four percent less white fish in 1959 than in 1958.

The White Fish Authority has published detailed information on its 1959 survey of the costs and earnings of inshore fishermen. They took a sample of 498 vessels--256 from Scottish ports and 242 from England and Wales; all grant-aided. The sample covered 130 inshore ports and included vessels from all the major inshore fishing areas of Great Britain.

The value of the white fish landed by these vessels amounted to 36 percent of the total inshore catch--a higher proportion than has been recorded in previous surveys.

Of the vessels, 410 landed bottom fish; 265 of them exclusively. In Scotland seining predominated. In England and Wales a good proportion were engaged in trawling and pot fishing, but significant numbers carried out line fishing, pot fishing, and drifting, or various combinations of these methods.

Scottish seine and ring-net vessels of an average length of 50.3 feet had an average net surplus per vessel of £1,176 (US\$3,293), representing 13 percent of total earnings. Each member of the crew earned an average £732 (\$2,050) in the year.

At the bottom of the Scottish table in average net surplus were line vessels of an

average length of 31.3 feet. Each made only £67 (\$188), three percent of total earnings, while their crews' average annual wages were £261 (\$731) per man.

In England and Wales, 46-foot seine-net vessels took the highest average net surplus

at £594 (\$1,663) each, 7.3 percent of total earnings, and their crews averaged £675 (\$1,890) per man per annum--highest of all types. Vessels using drift net and pots, and averaging 29.7 feet showed an average loss per vessel of £23 (\$64.40), a debit of two percent on total earnings. Their crews averaged £357 (\$999.60) per man in the year.

The seine-net vessels in the sample for England and Wales were of under 70 feet engaged in fishing trips of not more than one or two days' duration.

The average surplus per stone calculated on the results of vessels for which weight information was given amounted to 10½d. per stone (about 0.857 U. S. cents a pound) in Scotland, and 7½d. (about 0.607 U. S. cents a pound) in England and Wales. The over-all average surplus per stone was slightly lower than in 1958.

There continued to be a strong correlation between the size of the vessels and the amount of the net surplus, and in most cases between the size of the vessels and the amount of the crews' remuneration.

In Scotland, however, this latter tendency was not clearly established: the highest scale of remuneration was earned in 40-50-foot vessels, and a somewhat lower scale in vessels of over 50 feet.

A member of the crew of a 40-50-foot vessel earned £754 (US\$2,110) in Scottish boats which had an average surplus of £899 (\$2,517). Corresponding figures in England and Wales were £448 (\$1,366) per man, with a boat profit of £337 (\$944).

In vessels of 60-70 feet, a Scottish fisherman drew £709 (\$1,985) against his English

United Kingdom (Contd.):

and Welsh counterpart's £874 (\$2,447), their boats averaging surpluses of £1,195 (\$3,460), and £1,138 (\$3,186) respectively.

The wide disparity in economics of specific kinds of fishing associated with certain districts was manifest in the South of Scotland's average net surplus per vessel of £1,305 (\$3,654) (each crewman averaging £810 or \$2,268) and East England's £77 or \$216 (with crews' wages of £432 or \$1,210 per man per year). (*Fishing News*, December 16, 1960.)



Venezuela

SHRIMP FISHERY TRENDS,
DECEMBER 1960:

The shrimp packing and freezing company that was established late in 1959 at Puerto La Cruz, Venezuela, reports that late in 1960 about 20,000 pounds of frozen shrimp were shipped to New York City. In addition, another 15,000 pounds were being processed for shipment.

Landings of shrimp in Venezuela, January-August 1960, amounted to about 1.5 million pounds, heads-on (valued at 871,144 bolivars or about US\$261,605 at exchange rate of 73.33 bolivars to US\$1), according to the Venezuelan Ministry of Agriculture's Division of Fish and Game. In 1959, shrimp landings for the entire year were about 3.5 million pounds.

There is some evidence that Venezuelan and foreign businessmen are becoming interested in freezing and exporting shrimp, the United States Embassy in Caracas reported on December 2, 1960.



Viet-Nam

SHRIMP INDUSTRY:

With the exception of one modern shrimp-processing firm, the shrimp caught in Viet-Nam are consumed locally and enter into international commerce only in the form of dried shrimp, of which a total of 150 metric tons were exported in the years 1956-59.

Estimates of the number of fishing boats in Viet-Nam run around 37,000. This is a conservative figure supported by a

Fisheries Expert of the U. S. Overseas Mission on the basis of his own extensive inquiries in the fishing areas. About 2,000 of these have been motorized, but the balance are sailing craft of various sizes and probably small sampans. There are no vessels in Viet-Nam devoted exclusively to shrimp fishing. Shrimp are caught with nets in shallow coastal waters, and deep-water shrimp are caught incidentally to the trawling operations. No information is available as to plans for vessel construction. There are continuing plans for motorization of the fleet.



The single shrimp-processing plant in Viet-Nam has been exporting to the United States market since early 1960. As of October 1, 1960, they had shipped about 50 metric tons to the United States (about 90 percent 16 shrimp to the pound or larger). Average selling price was US\$0.841 per pound f.o.b. Saigon. Official statistics for shrimp exports, January-August 1960 were: 22 tons of dried shrimp exported to Hong Kong; and 45 tons of frozen shrimp to the United States.

There are no export controls on shrimp, though an export tax of 5 percent ad valorem is imposed on all shrimp, dried or frozen. Proceeds of exports are given the benefit of the VN\$48-US\$1 rate, and also a subsidy of VN\$18.50 per kilo (about 24 U.S. cents a pound at official rate of exchange. VN\$35 equal US\$1).

The shrimp-processing company reports wage rates of 50-60 piasters (US\$1.43-1.71 at official rate of exchange) a day for employees in the processing end. It also claims that this figure is 10 to 15 percent higher than local wage rates.

The shrimp so far exported to the United States have been purchased from local fishermen at the market rate. The company is also in the process of raising shrimp in ponds in the mangrove swamps along the coast. The shrimp are fed on copra waste, and it is anticipated that the ponds will yield five metric tons of large shrimp per hectare (2.471 acres).

The commercial fish catch in 1959 by Viet-Nam was estimated at 152,000 metric tons, compared with 140,000 tons in 1958, an increase of 12,000 tons or 8 percent. Current expectations are that 1960 will show an even greater percentage increase in total catch. Continuing motorization of the fleet, and construction of freezing plants in various fishing centers are expected to keep raising the catch in the next few years, with concurrent possibilities of increased exports of shrimp. In addition, the shrimp-raising ponds are expected to come into production in the near future. The varieties usually exported are the larger sizes, and in view of the premium prices paid for these, it seems unlikely that Viet-Nam will try to expand exports of the smaller sizes. (U. S. Embassy, Saigon, November 29, 1960.)



West Africa

TUNA FISHERY TRENDS:

A booming development of the tuna fishery in the eastern South Atlantic and a rapid expansion of United States tuna industry interests in West Africa were reported by the Director of the Honolulu Biological Laboratory of the U. S. Bureau of Commercial Fisheries, who attended a tuna biologists' conference at Dakar, Senegal, West Africa, the latter part of 1960.

Two large California tuna-canning companies are setting up refrigeration facilities

in Ghana and Sierra Leone to receive Atlantic tuna for shipment to the canneries which they have built in recent years in Puerto Rico. At present the fish are supplied principally by the Japanese, who have a fleet of 60-80 large tuna long-line vessels fishing in the Atlantic and landing their catches in European, African, and Caribbean ports. French, Spanish, and Italian tuna fishermen and others are also moving into the fishery on an increasing scale. United States tuna clippers and purse-seiners have made several experimental trips into West African waters with promising results.



FISH TEMPERATURES AND THEIR SIGNIFICANCE

During most of 1959 and the early part of 1960, technologists of the National Fisheries Institute have carried metal-stemmed thermometers in their pockets in order to take a large number of temperature readings of fishery products at several stages in the unloading and processing operations and in a variety of plants. Here is a fairly typical series of readings:

Fish in the hold of a trawler, well imbedded in ice, 34° to 37° F. (In all these tests the 5-inch metal-stemmed thermometer was inserted into the center of the fish.)
 The same fish, unloaded and awaiting washing, 36° to 37° F.
 Fish after washing, 42° F.
 Fillets, immediately after cutting, 44° to 46° F.
 Fillets, trimmed, packed in 1-lb. cartons and weighed, 46° to 48° F.
 The water used to wash the fish was 61° F.
 The air temperature of the filleting room was 66° F.

Results such as these were found in almost all filleting operations tested. However in a few cases the finished product temperatures reached as high as 54° F.

What is the significance of these temperature readings? Are they low enough to retard spoilage of fish for a long period? Most certainly not! Castell, a well recognized Canadian researcher, reports that fish with the same historical background when held at different temperatures gave off spoilage odors as follows:

50° F. - 1½ days	37° F. - 5 days
41° F. - 3½ days	32° F. - 8 days

These and other studies emphasize that poorly-iced fish at 37° F. spoil nearly twice as fast as well-iced fish at 32° F. And at 41° F. the useful life of fish is cut to about one-third of that at 32° F.

These findings clearly prove the importance of temperatures in relation to the quality of fish or fishery products. When a producer sells a poorly-iced or refrigerated product he can expect complaints unless the product is marketed in a very short time. To double the time allowed for sale of the product, the only requirement is to reduce the temperature by 5° F.

When taking temperatures of the fish and fillets, it was observed that in many plants where better icing was needed there was an ample supply of ice but it was not being used to chill fish. Another observation was that in too many plants tins or packages of fillets were stacked solidly on trucks or skids, without benefit of ice, too long before removal to cooler.

--By G. Clifford Byrd, N. F. I. Technology Division;
 Review of talk given to Fresh Fish Committee at
 N. F. I. 1960 Convention in Miami Beach.



FEDERAL ACTIONS



Department of the Interior

FISH AND WILDLIFE SERVICE

FISHERY AGENCY BEGINS ITS NINETIETH YEAR:

Secretary of the Interior Stewart L. Udall on February 11, 1961, congratulated Interior's Bureau of Commercial Fisheries which began its 90th year of activity during that week.

It was on February 9, 1871, that the Federal Government entered the field of fisheries. On that day, the Congress created a one-man fish and fishery commission. Later an appropriation of \$5,000 was made. The law provided that the Commissioner was to be a qualified person who was already on the Government payroll and who was to receive no extra compensation for the new duties.

The Bureau of Commercial Fisheries of the Fish and Wildlife Service now has a responsibility in charting America's course in the development and utilization of fishery resources by developing the scientific facts pertaining to the many facets of those resources.

To do this, the Bureau has at this time 18 biological laboratories, 28 biological field stations, 5 technological laboratories, 2 technological field stations, 7 gear research and exploratory fishing bases, 10 market development offices, 36 statistical collection points, 7 Market News Service offices, as well as field headquarters for river basin, marine mammal, and fishery management activities; loans and grants offices; and several biological research and exploratory fishing vessels--again a far cry from the "two rooms in the basement" which housed the Commission some nine decades ago.

These far-flung operations are supervised from Regional Offices at Juneau, Alaska; Seattle, Wash.; St. Petersburg Beach, Fla.; Ann Arbor, Mich.; and Gloucester, Mass.

There are Area Offices at Terminal Island, Calif., and Honolulu, Hawaii.

That the Congress in 1871 had little idea of the enormity of the task ahead or that the work of its one-man Commission would extend over a lengthy period of time is evidenced by the fact that no provision was made for quarters or office space. Hence the Commissioner had to convert a portion of his private residence at 1445 Massachusetts Avenue NW, Washington, D.C., into an office-laboratory. Later the house next door was rented with Congressional approval. Still later in 1889, the Commission, which by that time had grown, was collected under one roof in the Armory Building at Sixth and B Streets SW., where it remained for about 40 years until it moved into the Department of Commerce Building.

The Fish Commission got off to an auspicious start by the selection of the first Commissioner, Spencer F. Baird, and outstanding biological scientist at that time. In fact, when Professor Baird moved to Washington from Dickinson College, Pa., in 1850 to become Assistant Secretary of the Smithsonian Institution, he shipped his huge private collection of two carloads of biological specimens to the Institution.

Professor Baird's studies substantiated the reports that the supply of fish in New England waters was decreasing, but he found no evidence of any shortage of food for those species nor any evidence of epidemic disease. He came to the conclusion that the chief reason for the decline was the activities of man. For that reason, he recommended that the taking of fish by trap or pound be stopped on weekends during the spawning period, which was about six weeks each year for the species concerned.

The construction and the launching of the vessel Fish Hawk in 1880 was the beginning of a fleet which has included as many as 17

"ocean-going vessels" ranging in length from 57 feet to 179 feet and 100 inboard and outboard craft varying in length from 16 feet to more than 40 feet.

The second vessel was the Albatross (the first of three by that name) constructed in 1881. The Albatross was used for biological research and exploratory fishing in the Atlantic from Halifax to the West Indies. Later it sailed through the Straits of Magellan and did 28 years of service in the Pacific Ocean.

Both the Fish Hawk and the Albatross did a "hitch" in the Navy. The Fish Hawk was a gunboat in the Mosquito Fleet in the Spanish-American War, and the Albatross was an auxiliary cruiser in the same conflict. The Fish Hawk was decommissioned in 1926 after 46 years of service. The Albatross was decommissioned in 1924.

The early years of the century saw many changes in fishery activities. By an act of Congress passed February 14, 1903, the Fish Commission was made part of the Department of Commerce and Labor, effective July 1 of that year. The name of the organization was changed by order of the Secretary to the Bureau of Fisheries.

And the Bureau of Fisheries or the U. S. Bureau of Fisheries it was to remain until 1939-1940 when it was transferred from the Department of Commerce to the Department of the Interior and united with the Bureau of Biological Survey to become the Fish and Wildlife Service. Its present title, the Bureau of Commercial Fisheries, stems from the reorganization of 1956.

In 1911, an international convention was formed for the protection of fur seals. Sig-



natory powers were Russia, Japan, Canada, and the United States. The result is that under the management and protection given through the Bureau of Commercial Fisheries, the Pribilof Islands seal herd has stabilized at about 1.5 million animals, about ten times the number there when the convention was signed. The herd produced a \$4.5 million harvest last year.

It was in 1923 that the first of a series of international conventions on fish was signed. That year the United States and Canada formed the International Convention for the Conservation of Pacific Halibut. As a result, the annual harvest has almost doubled and the yield is sustained year after year.

The famous Fraser River sockeye salmon fishery was converted from a dwindling resource to an enlarged and sustained one by the agreement between the United States and

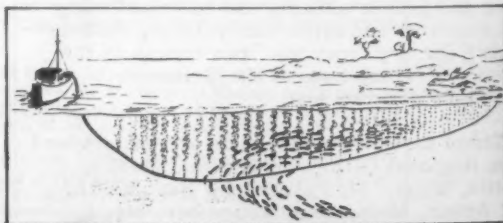


Canada in 1937. These two nations, again working in unison and utilizing in-

formation on sea lamprey control developed by the Bureau of Commercial Fisheries scientists, are about to emerge victorious from the long fight to rid the Great Lakes of the predatory sea lamprey. Other international conventions are also showing results in the effort to provide management and sustained yields of designated fish stock.

There are many milestones in the 90-year history.

Bureau biologists investigating tuna resources in the Pacific some 10 years ago discovered what is now called the Cromwell Current (after the oceanographer who found it) deep in the Pacific Ocean. This great



Air-bubble curtain diverts and guides fish.

river well beneath the surface is probably a thousand times greater than the Mississippi.

An air-bubble curtain has been found to be a veritable stone wall in stopping and turning traveling schools of fish in the sea and in aiding their capture.

Chemical analyses of fish and fish oil have opened the door to many things, one of which is the possibility of controlling cholesterol levels in the blood-stream and subsequently lessening the danger of heart attacks by including fish or fish oils in the diet.

Secrets of refrigeration, transportation, and otherwise handling of fish have been probed and techniques developed to assure the consumer quality fishery products. Product inspections and grade standards have been instituted.

Consumer buying habits have been probed; methods of preparing intriguing fish dishes have been made available to the housewife.



Market reports, including data on prices, supply, and demand, have been made available daily to both buyer and seller.



Fishery Marketing Specialist of the Fishery Market News Service checking on market information over the phone.

Exploratory fishing has discovered new shrimp stocks in the Gulf of Mexico, in Alaska waters, and off the coast of the northwestern States; new lobster beds have been found in deep water areas off New England; tuna, in the Gulf Stream in the Atlantic Ocean and in various areas in the Pacific Ocean; commercial scallop beds have been found off the southeastern coast; hard clams, discovered off North Carolina shores. Gear research has developed through the use of underwater television, and the telemeter has been adapted to midwater trawl fishing. Techniques for collecting commercial fishery statistics and market information and disseminating the data to industry and the public have been developed and refined.



Treasury Department

BUREAU OF CUSTOMS

GROUNDFISH FILLET IMPORT TARIFF-RATE QUOTA FOR 1961:

The reduced-tariff-rate import quota on fresh and frozen groundfish (cod, haddock, hake, pollock, cusk, and ocean perch) fillets and steaks for calendar year 1961 is 32,600,645 pounds, the Bureau of Customs announced in the February 7 Federal Register. Divided into quarterly quotas this means that 8,150,161 pounds of groundfish fillets and steaks during each quarter of 1961 may be imported at the $1\frac{1}{4}$ -cents-per-pound rate of duty, and any imports over the quarterly quota will be dutiable at the rate of 2.5 cents a pound.

The reduced-rate import quota for 1961 is 10.8 percent less than the 1960 quota of 36,533,173 pounds. From 1951 to 1960 the quantity of fresh and frozen groundfish fillets permitted to enter the United States at the reduced rate of duty of $1\frac{1}{4}$ cents a pound had increased 24.7 percent, but in 1961 the trend was reversed significantly for the first time because in 1960 frozen fish fillet blocks with bits and pieces were no longer dutiable under the Tariff category of "frozen groundfish fillets." The increase in the quota from 1951 to 1961 is now only 11.3 percent.

Average aggregate apparent annual consumption in the United States of fresh and frozen groundfish fillets and steaks (including the fillet blocks and slabs used in the

Reduced-Tariff-Rate Import Quota for Fresh and Frozen Groundfish Fillets, 1951-1961	
Year	Quota 1,000 Lbs.
1961	32,601
1960	36,533
1959	36,920
1958	35,892
1957	37,376
1956	35,197
1955	35,433
1954	33,950
1953	33,866
1952	31,472
1951	29,290

manufacture of fish sticks, but excluding fish blocks since September 15, 1959, and blocks of fish bits) for the three years (1958-1960) preceding 1961 was only 217,337,633 pounds, calculated in accordance with the proviso to item 717(b) of Part 1, Schedule XX, of the General Agreement on Tariff and Trade (T. D. 51802). This was less than the consumption of 243,554,480 pounds for 1957-1959.

A decision by the United States Customs Court in 1959 held that fish blocks imported in bulk are dutiable at one cent a pound under Tariff paragraph 720(b). Prior to that decision, fish blocks were classified under paragraph 717(b), the same as fish fillets. The change became effective September 15, 1959, and fish blocks imported in bulk since that date have been classified under paragraph 720(b). Therefore, fish blocks imported since the effective date have not entered in the calculation of apparent annual consumption or the quota since only imports under 717(b) are considered in the calculation. In view of this, it is estimated that if fish blocks had remained under the 717(b) classification, apparent annual consumption for 1958-1960 would have been greater than that for the previous three-year period, and also the quota for 1961 would have been greater than that for 1960.

Note: Also see *Commercial Fisheries Review*, May 1960 p. 72.

RULING ON TRANSFER OF SHRIMP CARGO AT SEA:

An enrolled licensed United States fishing vessel that returns to port with the catch of another United States fishing vessel is in violation of its license, if both vessels involved are not owned or under charter by the same individual or firm. Such a vessel has been adjudged to be engaged in "freighting," even though no charge is made by the carrying vessel. Existing U. S. Customs regulations require such a vessel to be registered and

upon port arrival to present a manifest and Customs entry or entries must be filed on the cargo on board pursuant to Sect. 10.78 and 10.79 of the Customs Regulations.

Legislation was introduced in the 86th (second session) Congress to allow a United States fishing vessel with an enrolled license to return the catch of another United States fishing vessel to a port in the United States. There are plans to introduce the bill again in the current session of Congress. In the meantime, the Bureau of Customs has notified the various Customs Districts of the Gulf to withhold enforcement of existing licensing regulations pending outcome of the legislation.

Customs Regulations 10.78 and 10.79 calling for the manifesting and entry of transferred shrimp as cargo, unlike the licensing provision, are administrative rather than statutory regulations. In a letter under date of December 2, 1960, from Acting Commissioner of Customs Lawton M. King to Congressman Joe Kilgore of Texas, the Commissioner stated that the Bureau was giving the problem its consideration and that until a final decision in the matter is reached, the Customs collectors of the Gulf Coast districts were being requested not to require manifesting of the cargo and entry pending such decision.

The Coast Guard has made the following policy decision in the matter: "Fishing vessels of the United States engaged in the catching of fish as a regular occupation shall not be subject to the provisions of the inspection laws requiring Coast Guard inspection and certification if, on occasion, they take on board on the high seas and transport to a port of the United States the catch of another fishing vessel of the United States on an accommodation basis. Accordingly, such vessels continue to be exempt from Coast Guard inspection being deemed not to be carrying cargo for hire."

Accordingly, a shrimp vessel may transfer shrimp caught on the high seas or in the territorial waters of the United States from one United States fishing vessel to another, and the carrying vessel may return to a United States port without being held in violation of its enrolled license, nor subject to Customs Regulations 10.78 and 10.79 pending final decision in the matter.

The crew of the carrying vessel may be paid for the labor involved in the transfer

and attention of such transferred shrimp. The carrying vessel cannot charge for such hauling since this would be "cargo for hire" and subject such vessel to Coast Guard inspection and certification and also the requirement of register under Customs laws.



Eighty-Seventh Congress

(First Session)

Public bills and resolutions which may directly or indirectly affect fisheries and allied industries are reported. In introduction, referral to committees, pertinent legislative actions, hearings, and other actions by the House and Senate, as well as signature into law or other final disposition are covered.



AQUATIC RESOURCES EXPANSION: H. R. 4276 (Geo. P. Miller), a bill to expand and develop the aquatic resources of the United States including the oceans, estuaries and rivers, the Great Lakes, and other inland waters, to enhance the general welfare, and for other purposes; to the Committee on Merchant Marine and Fisheries.

BUDGET OF THE UNITED STATES: H. Doc. No. 15, The Budget of the United States Government for the Fiscal Year Ending June 30, 1962, 87th Congress, 1st Session. The budget as submitted January 16, 1961, to the Congress, provides increases in budget estimates for the Fish and Wildlife Service. For the Office of the Commissioner \$364,000--the same as in 1961.

Estimates of Bureau of Sport Fisheries and Wildlife total \$58,721,000 as compared with \$55,368,000 in 1961. Increases are proposed in Management of Fishery Resources, Fishery Research, Predatory Animals and Rodent Control, Construction, and grants to State and local governments under permanent authorizations.

The 1962 budget estimates for the Bureau of Commercial Fisheries total \$29,725,000 as compared to \$21,451,000 for fiscal 1961. Marketing and Technology would be increased to \$4,735,000, compared to \$4,334,000 in 1961; Research would be increased to \$7,690,000, compared to \$6,614,000 in 1961; research on fish migration over dams--\$527,000, compared to \$303,000 in 1961; Columbia River fishery facilities--\$1,915,000 in 1962. Total construction would amount to \$7,561,000, compared to \$2,645,000 in 1961. General administrative expenses would be \$813,000, compared to \$699,000 in 1961. Administration of Pribilof Islands would be less--\$1,981,000 compared to \$2,099,000 in 1961; payments to Alaska, Pribilof Islands receipts--\$539,000, compared to \$1,050,000 in 1961. The Fisheries Loan Fund would be \$2,505,000--same as 1961; and construction differential subsidy for fishing vessels--\$1,000,000, compared to \$750,000 in 1961.

Total amount estimated for the Fish and Wildlife Service is \$88,810,000, compared to \$77,183,000 in 1961.

BUY AMERICAN ACT AMENDMENTS: H. R. 4344 (Osterag), on Feb. 15, introduced in House; to Committee on Public Works. Similar to H.R. 1108 (Van Pelt). Would amend act of March 3, 1933, with respect to determining when costs of certain articles, materials, or supplies are unreasonable.

CALIFORNIA FISHING PROBLEMS: On Feb. 15, a memorial of Legislature of the State of California was presented in House. Memorializes President and Congress of United States relative to Federal study of California fishing problems; to Committee on Merchant Marine and Fisheries.

DEPRESSED AREAS: Executive Communication 585, was received by the House on Feb. 20, a communication from the President of the United States transmitting draft of a proposed bill entitled "A bill to establish an effective program to alleviate conditions of substantial and persistent unemployment and underemployment in certain economically-distressed areas;" to Committee on Banking and Currency.

H. R. 4569 (Spence), introduced in House Feb. 20, a bill in accordance with message from the President; to Committee on Banking and Currency.

Also introduced in House Jan. 30: H.R. 3581 (Santangelo), H.R. 3583 (Saund); Jan. 31: H.R. 3675 (Morgan), H.R. 3685 (Saylor); Feb. 2: H.R. 3743 (Daniels); Feb. 16: H.R. 4403 (Denton); Feb. 20: H.R. 4596 (Slack); Introduced in Senate Feb. 9: S. 895 (McNamara).

On Feb. 20, the Senate received memorial from Colorado Legislature regarding areas within the State to be included within provisions of area redevelopment legislation.

On Feb. 24, Subcommittee No. 2 of the House Committee on Banking and Currency held hearings on H.R. 4569.

EXPORT POLICY ACT OF 1961: S. 852 (Javits and Case), introduced in Senate, Feb. 9, a bill to encourage and promote the expansion through private enterprise of domestic exports in world markets; to Committee on Interstate and Foreign Commerce. Proposes to provide a coordinated and augmented program of Government action designed to assist U.S. manufacturers and businessmen in recognizing and developing the opportunities in export markets.

FEDERAL BOATING ACT OF 1958 AMENDMENTS: S. 883 (Magnuson), introduced in Senate, Feb. 9, a bill to extend the application of the Federal Boating Act of 1958 to certain possessions of the United States; to Committee on Interstate and Foreign Commerce. Would extend the application of the Federal Boating Act of 1958 to certain United States possessions--the Commonwealth of Puerto Rico, the Virgin Islands, and Guam. These possessions would be authorized to inaugurate their own program of numbering motorboats, as do the 50 states and District of Columbia, since Federal Government authority in this respect in the territories mentioned expired April 1, 1960.

FEDERAL TRANSPORTATION DEPARTMENT: S. 887 (Case, Javits, Keating), introduced in Senate Feb. 9, a bill to establish a U.S. Department of Transportation; to Committee on Government Operations. Would put the nonregulatory transportation functions scattered through a number of Federal agencies together under a separate Department of Transportation. Would transfer to new Department, headed by a Secretary of Trans-

portation, the functions of Federal Aviation Agency, Maritime Administration, Bureau of Public Roads; the present promotional and executive functions of the regulatory commissions, such as Interstate Commerce Commission and Civil Aeronautics Board. Over-all objective of legislation is to create a single agency to coordinate present jumble of Federal programs in transportation field.

FOOD ADDITIVES: S. 947 (Hill), introduced in House Feb. 13; to Committee on Labor and Public Works. Would amend certain provisions of act to protect public health by prohibiting use of additives in food which have not been adequately tested to establish their safety. Identical to H.R. 3980 (Harris).

Support of a legislative proposal to allow industry additional time for scientific study and safety clearance of food additives which were in commercial use before January 1, 1958, was announced February 16 by the Secretary of Health, Education, and Welfare. The draft bill was sent to the Chairman of the House Committee on Interstate and Foreign Commerce by letter of January 13, 1961, by the former Secretary of the Department.

At that time the Commissioner of Food and Drugs said the proposed extension beyond the March 6, 1961, final deadline of the Food Additives Amendment of 1958 was needed to permit manufacturers to complete safety studies, where such studies or other bona fide actions to determine the applicability to the amendment were begun on food additives prior to March 6, 1960.

The additional time would be allowed for those additives which were in commercial use before January 1, 1958, and which were given time extensions until March 6, 1961, on the basis of findings that such continued use would involve no undue risk to the public health. About 3,000 such additives received time extensions. The proposed bill would allow further time only on a case-by-case basis and where procedures were started by the manufacturer or user of the additive before March 6, 1960, looking toward a resolution of any food additive problem involved. The amount of additional time would likewise be individually determined by the Food and Drug Administration on the basis of the facts in each case. The Commissioner said this was in line with provisions in the recently enacted Color Additives Amendment.

FOOD STAMP PLAN: On Feb. 20 Senate received resolution of House of Representatives of State of Washington to extend the food stamp plan pilot projects to include the State of Washington.

FOREIGN TRADE EFFECT STUDY: H. Res. 151 (Dent), introduced in House, Feb. 7, a resolution authorizing investigation of effects of foreign trade on American economy; to the Committee on Rules.

GAME AND FOOD FISH CONSERVATION IN DAM RESERVOIRS: H. R. 4275 (Johnson of Calif.), introduced in House Feb. 13; H.R. 4612 (McFall), introduced in House Feb. 20; H.R. 2722 (Clem Miller), introduced in House Jan. 16, identical bills to direct the Secretary of the Interior to establish a research program in order to determine means of improving the conservation of game and food fish in dam reservoirs; to Committee on Merchant Marine and Fisheries. Also restricted to game fish conservation only: H.R. 3072 (Reifel), introduced in House Jan. 23, to Committee on Merchant Marine and Fisheries; and S. 813 (Case of S. Dak.), introduced in Senate Feb. 6; to Committee on Interstate and Foreign Commerce.

IMPORT COMPETITION ADJUSTMENT: H.R. 4430 (Harrison of Wyo.) and H.R. 4457 (Ostertag), introduced in House Feb. 16; to Committee on Ways and Means. Similar or identical to H.R. 184 (Walter). Would provide for adjustment of conditions of competition of foreign and domestic industries with respect to level of wages. Similar or identical bills introduced in House Feb. 6: H.R. 3868 (Berry); Feb. 7: H.R. 3962 (Dent); Feb. 9: H.R. 4180 (Whalley), H.R. 4106 (Lane), H.R. 4144 (Mc Intire).

IMPORT POLICY ACT OF 1961: S. 851 (Javits and Case), introduced in Senate, Feb. 9, a bill to assist business enterprises, communities, and individuals to make necessary adjustments required by changed economic conditions resulting from the trade policies of the United States; to the Committee on Finance. Would provide assistance to alleviate serious injury from imports in form of loans, tax incentives, and technical aids to qualified businesses, communities, and industrial development corporations; together with special unemployment compensation, retraining assistance, provisional for early retirement, and relocation allowances for workers.

MINIMUM WAGE LEGISLATION: Executive Communication 538, received in House Feb. 7, a communication from the President of the United States, transmitting draft of proposed bill entitled "A bill to amend the Fair Labor Standards Act of 1938, as amended, to provide coverage for employees of large enterprises engaged in retail trade or service and of other employers engaged in commerce or in the production of goods for commerce, to increase the minimum wage under the act to \$1.25 an hour, and for other purposes;" to the Committee on Education and Labor.

H.R. 3935 (Roosevelt), introduced in House on Feb. 7, a bill on minimum wage in accordance with the message from the President. These amendments to Fair Labor Standards Act would provide an increase in the Federal minimum wage to \$1.15 an hour during the first year, \$1.20 during the second year, and \$1.25 thereafter for those employees who now have minimum wage protection. Also provides for those employees brought under act for the first time, a minimum wage of not less than \$1 an hour during the first year, \$1.05 the second year with time and one-half for hours in excess of 44 per week; \$1.15 the third year, with time and one-half for hours in excess of 42 a week; and \$1.25 thereafter, with time and one-half for hours in excess of 40 a week. Would extend minimum wage protection to, but not change existing overtime exemption for, onshore fish processing. Minimum wage exemption applicable to employees engaged in fish processing and distributing fish and related products would be limited to offshore activities. Subsection (a) and (b) of section 13 is amended to exempt: "(5) any employee employed in the catching, taking, propagating, harvesting, cultivating, or farming of any kind of fish, shellfish, crustacea, sponges, seaweeds, or other aquatic forms of animal and vegetable life, or in the first processing, canning, or packing such marine products at sea as an incident to or in conjunction with such fishing operations, including the going to and returning from work and loading and unloading when performed by any such employees." The exemption provisions of section 7 shall not apply with respect to: "(4) any employee employed in the canning, processing, marketing, freezing, curing, storing, packing for shipment, or distributing of any kind of fish, shellfish, or other aquatic forms of animal or vegetable life, or any byproduct thereof." Would also institute three-step increase in existing wage orders in Puerto Rico and Virgin Islands.

On Feb. 13, identical message from President received in Senate; referred to Senate Committee on Labor and Public Welfare.

Also introduced in House Jan. 12: H.R. 2514 (Rabaut), H.R. 2412 (Dingell); Jan. 31: H.R. 3643 (Byrne), H.R. 3561 (Healey); Feb. 2: H.R. 3763 (Halpern); Feb. 7: H.R. 3937 (Addonizio); Feb. 9: H.R. 4106 (Mrs. Green of Oreg.); Feb. 16: H.R. 4400 (Denton); H.R. 4446 (Lesinski), H.R. 4464 (Santangelo); Feb. 21: H.R. 4578 (Mrs. Kelly); to House Committee on Education and Labor. Introduced in Senate Feb. 9: S. 895 (McNamara); to Senate Committee on Labor and Public Welfare.

On Feb. 23, the Special Subcommittee on Labor of the House Committee on Education and Labor began executive consideration of H.R. 3935. No final action was taken on the bill.

NATIONAL AQUARIUM IN DISTRICT OF COLUMBIA: S. 954 (Engle), introduced in Senate Feb. 16, a bill to authorize the Secretary of Interior to construct a National Aquarium in District of Columbia; to Committee on District of Columbia. Identical to H.R. 111 (Kerwin).

NATURAL RESOURCES CONSERVATION: H.R. 4437 (Johnson of Calif.), introduced in House Feb. 15; to Committee on Interior and Insular Affairs. Would declare a national policy on conservation, development, and utilization of natural resources. Similar to S. 239 (Engle).

PRESIDENT'S MESSAGE: On Feb. 23, the House of Representatives received and read the message from the President relative to consolidations and improvement of resource conservation policies of the Federal Government. It contains statements on water resources, electric power, forests, public lands, ocean resources, and recreation. Message referred to Committee of Whole House on the State of the Union and ordered printed as House Document (H. Doc. 94). The statement on ocean resources follows:

"V. Ocean Resources

"The sea around us represents one of our most important but least understood and almost wholly undeveloped areas for extending our resource base. Continental Shelves bordering the United States contain roughly 20 percent of our remaining reserves of crude oil and natural gas. The ocean floor contains large and valuable deposits of cobalt, copper, nickel, and manganese. Ocean waters themselves contain a wide variety of dissolved salts and minerals.

"Salt (and fresh water) fisheries are among our most important but far from fully developed reservoirs of protein foods. At present levels of use, this country alone will need an additional 3 billion pounds of fish and shellfish annually by 1980, and many other countries with large-scale protein deficiency can be greatly helped by more extensive use of marine foodstuffs. But all this will require increased efforts, under Federal leadership, for rehabilitation of depleted stocks of salmon and sardines in the Pacific, groundfish and oysters in the Atlantic, lake trout and other desirable species in the Great lakes, and many others through biological research, development of methods for passing fish over dams, and control of pollution.

"This administration intends to give concerted attention to our whole, national effort in the basic and

applied research of oceanography. Construction of ship and shore facilities for ocean research and survey, the development of new instruments for charting the seas and gathering data, and the training of new scientific manpower will require the coordinated efforts of many Federal agencies. It is my intention to send to the Congress for its information and use in considering the 1962 budget, a national program for oceanography, setting forth the responsibilities and requirements of all participating Government agencies."

Identical message was received in Senate Feb. 24; referred to Senate Committee on Interior and Insular Affairs.

NAVIGATION AND INSPECTION LAW AMENDMENT: Fees for Certain Services Under the Navigation and Vessel Inspection Laws (Hearing before the Subcommittee on Coast Guard, Coast and Geodetic Survey, and Navigation of the Committee on Merchant Marine and Fisheries, House of Representatives, 86th Congress, 2nd Session, on H.R. 5841, a bill to repeal and amend certain statutes fixing or prohibiting the collection of fees for certain services under the navigation and vessel inspection laws, February 25, 1960), 29 pp., printed. Contains testimony of Government officials, officials of American Merchant Marine Institute, and American Waterways Operators, Inc.; and a table by the American Merchant Marine Institute.

OCEANOGRAPHIC RESEARCH PROGRAM: S. 901 (Magnuson), introduced in Senate, Feb. 9, a bill to advance the marine sciences, to establish a comprehensive 10-year program of oceanographic research and surveys, to promote commerce and navigation, to secure the national defense, to expand ocean, coastal, and Great Lakes resources, to authorize the construction of research and survey ships and laboratory facilities, to expedite oceanographic instrumentation, to assure systematic studies of effects of radioactive materials in marine environments, to enhance the public health and general welfare, and for other purposes; to the Committee on Interstate and Foreign Commerce.

ORGANIZATION FOR ECONOMIC COOPERATION AND DEVELOPMENT: The President submitted to the Senate for ratification on January 17 the Convention on the Organization for Economic Cooperation and Development signed at Paris on December 14, 1960 (Executive E). Includes copies of two protocols, report of Secretary of State, with a copy of Convention; referred to Committee on Foreign Relations. Treaty would forge new link between Western Europe and North America, would provide means to intensify economic consultation and cooperation to meet new challenges facing member countries. Would include United States, Canada, and 18 other countries.

On Feb. 15, Committee on Foreign Relations concluded hearings on the Convention, after receiving testimony from various Congressmen, unions, and the Secretary of State.

OUTDOOR RECREATIONAL RESOURCES: H.R. 4533 (Olsen), on Feb. 17, introduced in House a bill to provide a Federal aid program to assist states develop outdoor recreational resources; to Committee on Interior and Insular Affairs. Identical to H.R. 904 (Bennet of Fla.).

RADIATION PROCESSING OF FOOD: Senate Document No. 1, Annual Report to Congress of the Atomic Energy Commission for 1960 (January 1961, 87th Congress, 1st Session), 558 pp., illustrated, printed. In-

cluded in the discussion of the Commission's many activities is the Commission's program on radiation preservation of food, aimed at developing the technology to demonstrate technical and practical feasibility of using relatively low amounts of radiation to extend the refrigerated shelf life of perishable foods.

STERN RAMP TRAWLER: S.J. Res. 52 (Magnuson), introduced in Senate Feb. 16, a joint resolution to authorize the Secretary of Commerce to construct a modern stern ramp trawler to be used for research purposes and authorizing the appropriation of funds; to Committee on Interstate and Foreign Commerce. Identical to H.J. Res. 234 (Westland).

SUBMERGED LANDS ACT AMENDMENTS: H.R. 4390 (Brooks of La.), introduced on Feb. 16, a bill to extend seaward boundaries of Alabama, Mississippi, and Louisiana, 3 marine leagues into Gulf of Mexico; to Committee on the Judiciary. Similar to H.R. 22 (Roberts).

TARIFF NEGOTIATIONS: Memorial of the Legislature of State of Massachusetts received in Senate on February 9, memorializing the President and Congress of the United States against granting concessions on textile and fish imports from foreign countries; to Committee on Finance.

Also introduced in House Jan. 31: H. Con. Res. 132 (Grey), H. Con. Res. 135 (Saylor); Feb. 2: H. Con. Res. 138 (Gross), H. Con. Res. 139 (Harp); Feb. 7: H. Con. Res. 144 (Hechler); Feb. 9: H. Con. Res. 147 (Betts), H. Con. Res. 149 (Harrison of Wy.), H. Con. Res. 154 (Moorehead of Ohio), H. Con. Res. 155 (O'Konski); Feb. 13: H. Con. Res. 156 (Van Pelt); Feb. 16: H. Con. Res. 162 (Garland); Feb. 23: H. Con. Res. 171 (Whalley); Feb. 27: H. Con. Res. 172 (Ashmore), H. Con. Res. 173 (Huddleston), H. Con. Res. 174 (Mrs. Kee), H. Con. Res. 175 (King of Utah), H. Con. Res. 176 (Knox), H. Con. Res. 180 (Siler); to Committee on Ways and Means.

TRADE ADJUSTMENT PROBLEMS COMMITTEE: S. Res. 76 (Hartke and Randolph), Jan. 26, introduced in Senate, resolution establishing a special Committee on Trade Adjustment Problems; to the Committee on Rules and Administration. Committee would conduct complete study concerning (1) extent which unemployment or shifts in employment are caused by increase in imports resulting from tariff reductions; (2) likely extent of future unemployment or shifts in employment arising from increased imports resulting from tariff reductions; (3) history and content of plans and programs designed to assist workers and industries in adjusting to new competition arising from trade liberalizations; (4) feasible, practical plan or program of adjustment assistance for United States to give President additional powers to adjust import injury.

TARIFF STUDY COMMISSION: H. Res. 170 (Lipscomb), introduced in House Feb. 16; to Committee on Rules. Would provide a commission to study and report on influence of foreign trade on business and industrial expansion in United States. Similar to H.J. Res. 65 (Robison).

TARIFF STUDY BY HOUSE COMMITTEE: H. Res. 166 (Joelson), on Feb. 15, submitted a resolution authorizing an investigation of the problem of international fair labor standards; to Committee on Rules. Would authorize the Committee on Education and Labor to conduct a full and complete investigation and study of practicability and feasibility of formulation of a labor

standards schedule for specific industries in specific foreign nations whose goods enter the United States toward the end that a system of sliding scale of tariffs may ultimately be adopted.

H. Res. 170 (Lipscomb), submitted in House Feb. 16, a resolution to authorize the Committee on Banking and Currency to conduct an investigation and study of the operation of the Export Control Act of 1949, and related matters.

WATER POLLUTION: S. 861 (Humphrey and McCarthy), introduced in Senate, Feb. 9; also H.R. 4036 (Blatnik), H.R. 4037 (Smith of Miss.), H.R. 4038 (Dingell), H.R. 4039 (Burke of Ky.), H.R. 4040 (Davis of Tenn.), H.R. 4041 (Fallon); H.R. 4042 (Mrs. Green of Ore.); H.R. 4043 (Kastenmeier), H.R. 4044 (Johnson of Calif.), H.R. 4045 (Johnson of Wis.), H.R. 4046 (Lankford), H.R. 4047 (Moss), H.R. 4048 (Price), H.R. 4049 (Rogers of Colo.), H.R. 4050 (Ullman), introduced in House, Feb. 9 to amend the Federal Water Pollution Control Act to provide for a more effective program of water pollution control; to Committee on Public Works. Would increase the annual authorization of Federal matching grants of \$50 million to \$100 million a year for 10 years to help communities construct needed sewage treatment plants; also liberalizes other portions of the Act.

WATER POLLUTION CONTROL RESEARCH LABORATORY: H.R. 4827 (Mrs. Hansen), introduced in House Feb. 23; to Committee on Interstate and Foreign Commerce. Would establish a Federal Regional Water Pollution Control Research Laboratory in the Pacific Northwest. Identical to H.R. 2054 (Norblad).

WATER RESOURCES: Senate Report No. 29, Report of the Select Committee on National Water Resources (January 30, 1961, 87th Congress, 1st Session, pursuant to S. Res. 48, 86th Congress, together with supplemental and individual views), 159 pp., printed. In Part I of this summary report, the committee reviews principal findings of its studies, and presents its conclusions as to the nature of the task which faces the Nation in the years ahead, and gives eight committee recommendations. Part II presents material in substantiation of committee's findings and recommendations, includes discussion of some of the areas of action which were considered. Part III summarizes committee's activities and studies undertaken under its aegis, and concludes with supplemental views filed by several of the members of the committee. Contains 17 tables, map of water resource regions, and 2 graphs.

WATER RESOURCES ACTIVITIES IN THE UNITED STATES: Committee Print No. 18, Fish and Wildlife and Water Resources (April 1960, 86th Congress, Second Session, report of the Fish and Wildlife Service prepared for the Select Committee on National Water Resources, United States Senate, pursuant to S. Res. 48); 81 pp., illustrated, printed. Report on fish and wildlife conservation in relation to water resources development covers existing and projected future value of our fish and wildlife resources, both commercial and noncommercial and intangible values. Relation of fishing and hunting to other recreational activities is discussed together with the relation of fish and wildlife conservation activities to other water resources development activities. Estimated needs in this field through 1980, including quantitative and qualitative estimates of needs for water, are covered, together with the Department's recommendations as to what measures should be taken between now and 1980 to meet these needs. Contains tables, charts, appendixes (5), and graphic illustrations.

FISHERY INDICATORS

CHART 1 - FISHERY LANDINGS for SELECTED STATES

In Millions of Pounds

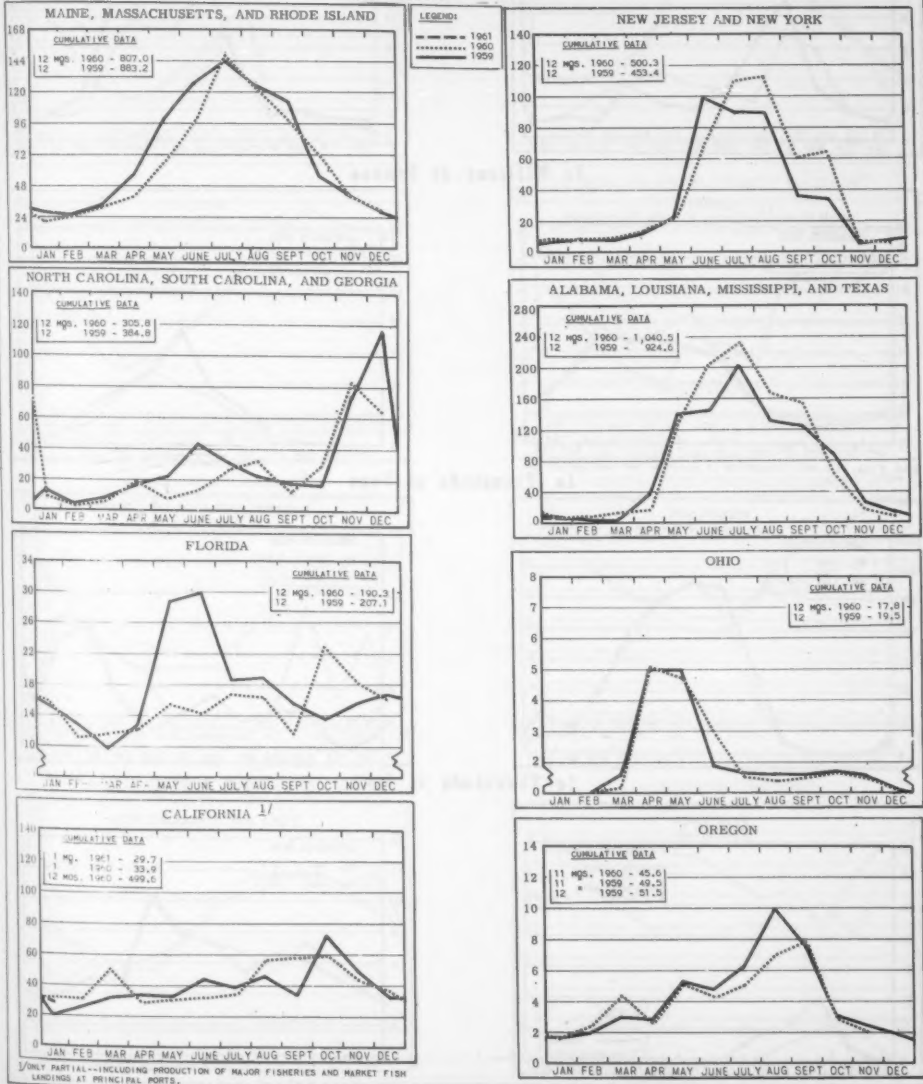
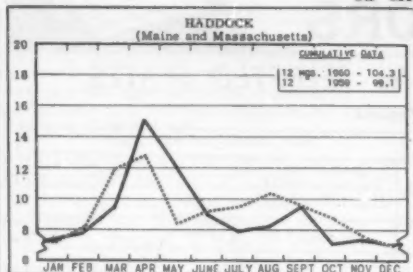
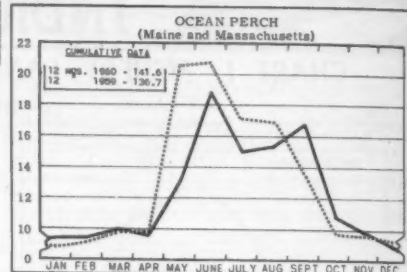


CHART 2 - LANDINGS for SELECTED FISHERIES

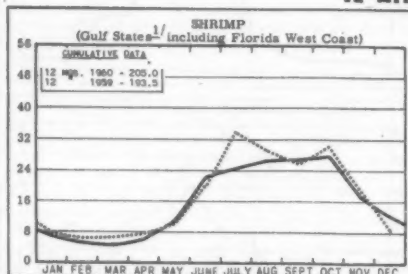
In Millions of Pounds



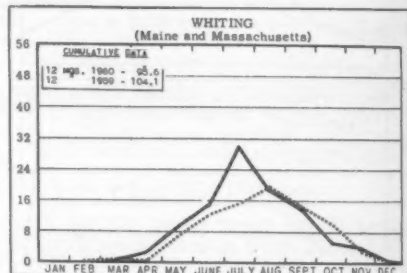
LEGEND:
— 1961
- - - 1960
- - - 1959



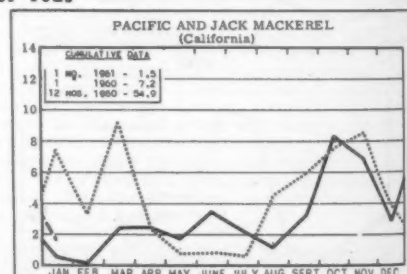
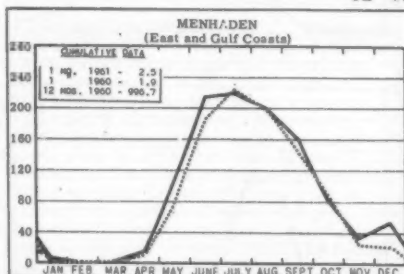
In Millions of Pounds



^{1/}L.A. & ALA. DATA BASED ON LANDINGS AT PRINCIPAL PORTS AND ARE NOT COMPLETE.



In Thousands of Tons



In Thousands of Tons

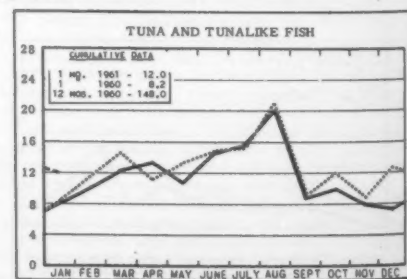
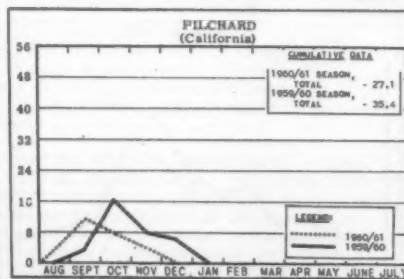
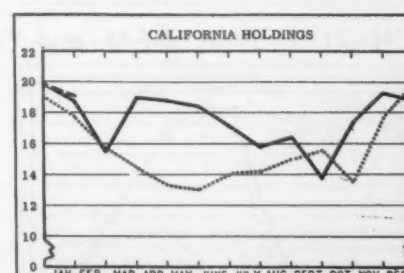
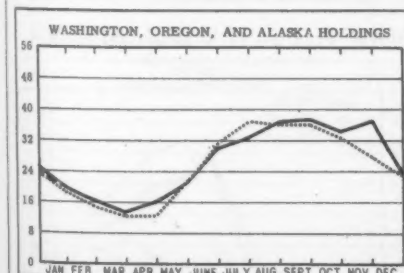
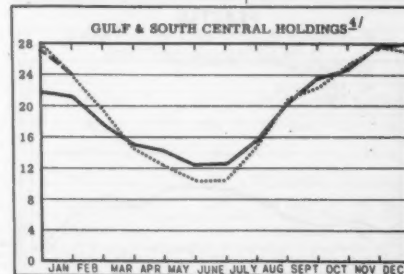
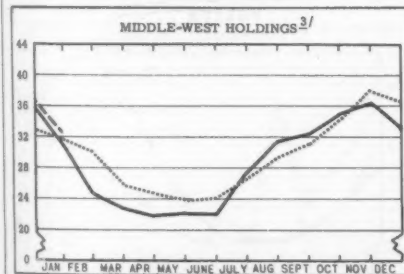
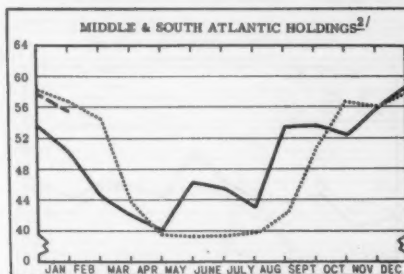
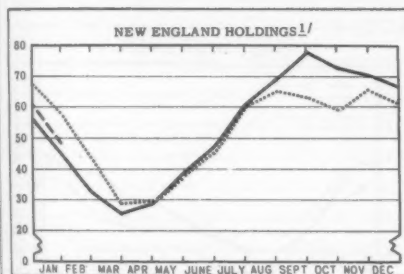
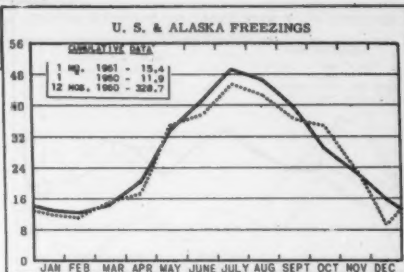
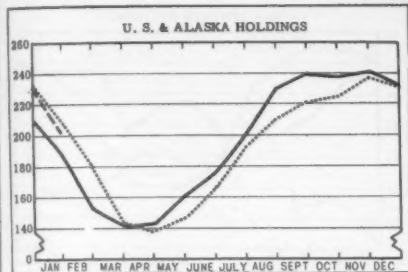


CHART 3 - COLD-STORAGE HOLDINGS and FREEZINGS of FISHERY PRODUCTS *

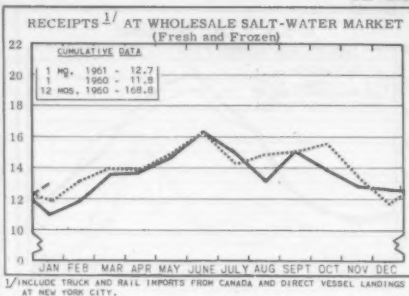
In Millions of Pounds



* Excludes salted, cured, and smoked products.

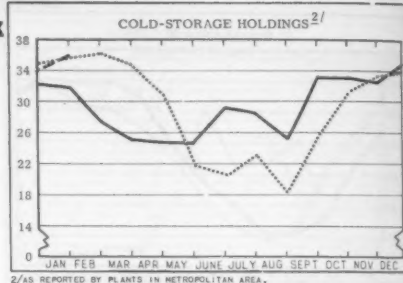
CHART 4 - RECEIPTS and COLD-STORAGE HOLDINGS of FISHERY PRODUCTS at PRINCIPAL DISTRIBUTION CENTERS

In Millions of Pounds

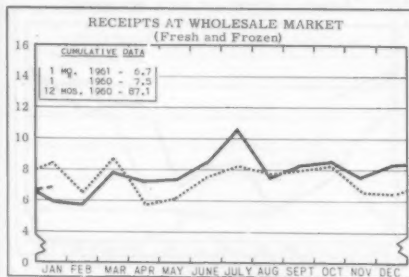


^{1/}INCLUDE TRUCK AND RAIL IMPORTS FROM CANADA AND DIRECT VESSEL LANDINGS AT NEW YORK CITY.

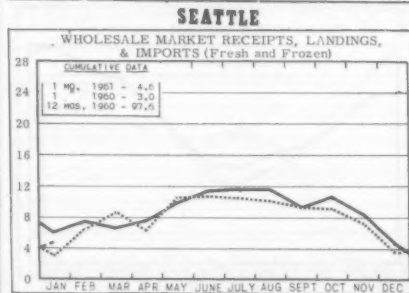
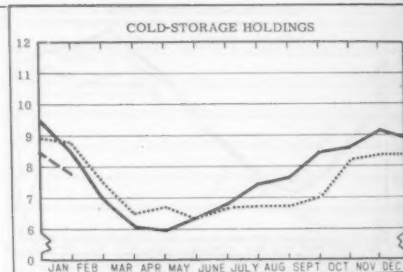
NEW YORK CITY



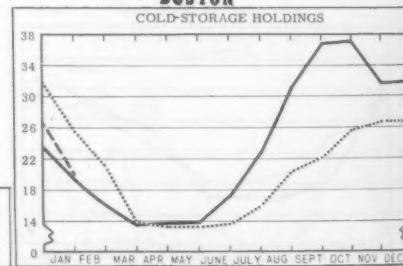
^{2/}AS REPORTED BY PLANTS IN METROPOLITAN AREA.



CHICAGO



BOSTON



LEGEND:

— 1961
..... 1960
- - - 1959

CHART 5 - FISH MEAL and OIL PRODUCTION - U.S. and ALASKA

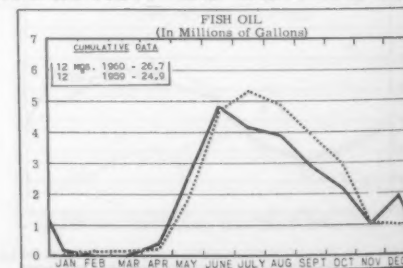
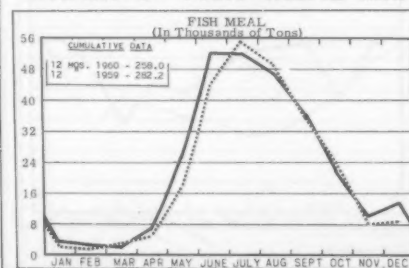
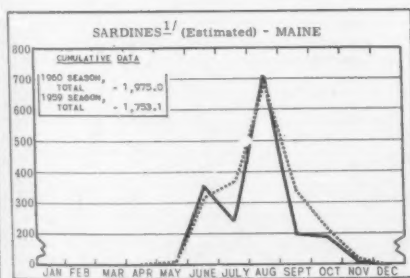
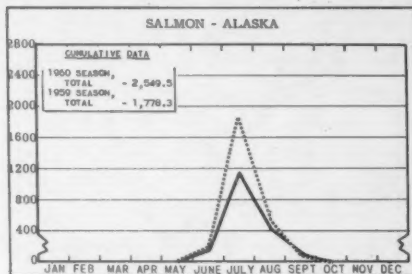
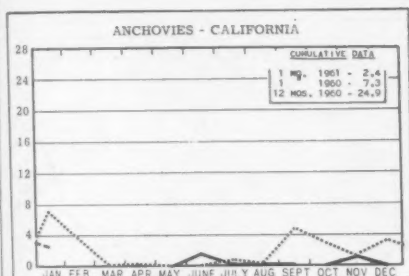
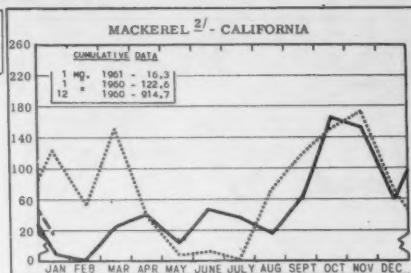
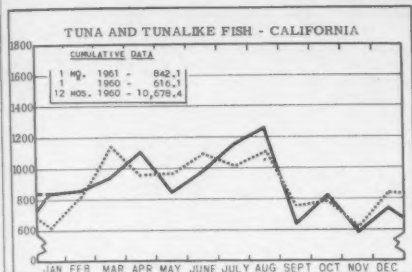


CHART 6 - CANNED PACKS of SELECTED FISHERY PRODUCTS

In Thousands of Standard Cases



STANDARD CASES

Variety	No. Case	Designation	Net Wgt.
SARDINES...	100	1/2 drawn	3 1/2 oz.
SHRIMP.....	48	--	8 oz.
TUNA.....	48	# 1 tuna	6 & 7 oz.
PILCHARDS...	48	# 1 oval	15 oz.
SALMON.....	48	1-lb. tall	16 oz.
ANCHOVIES...	48	1/2-lb.	8 oz.

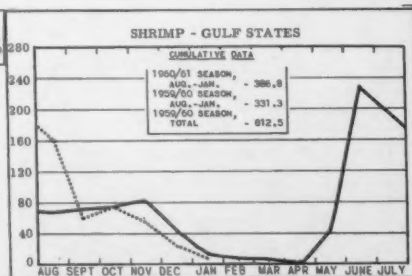
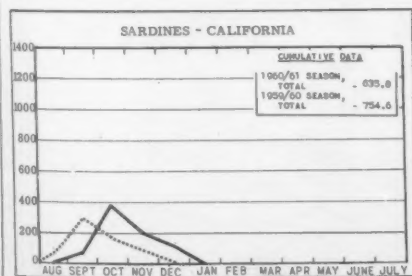
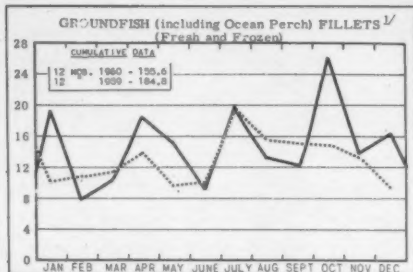


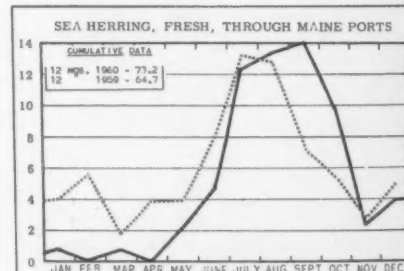
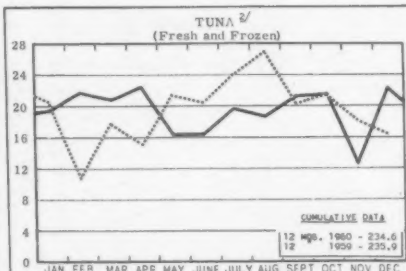
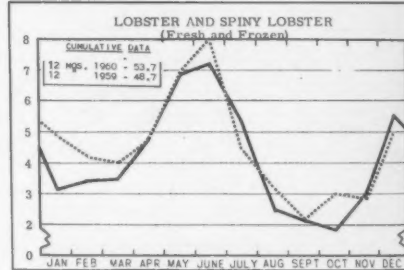
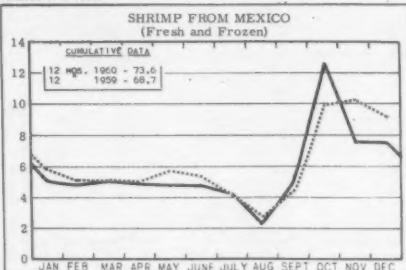
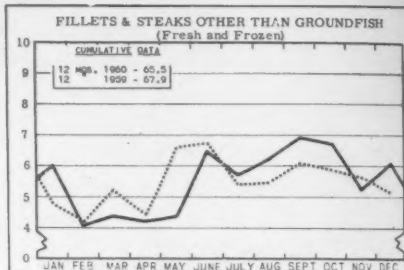
CHART 7 - U.S. FISHERY PRODUCTS IMPORTS

In Millions of Pounds

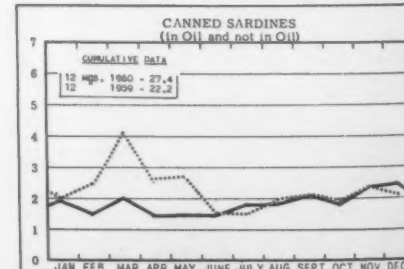
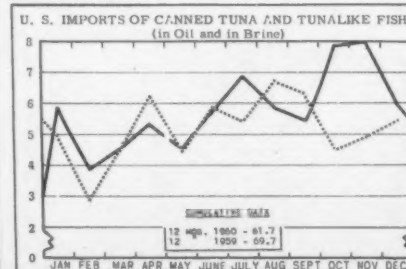


^{1/}SINCE SEPTEMBER 15, 1959, FISH FILLET BLOCKS ARE CLASSIFIED UNDER A DIFFERENT CATEGORY THAN FILLETS; THEREFORE, 1959 DATA ARE NO LONGER COMPARABLE WITH 1960.

LEGEND:
..... 1960
———— 1959



^{2/} EXCLUDES LOINS AND DISCS.





RECENT FISHERY PUBLICATIONS

FISH AND WILDLIFE SERVICE PUBLICATIONS

THESE PROCESSED PUBLICATIONS ARE AVAILABLE FREE FROM THE DIVISION OF INFORMATION, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON 25, D. C. TYPES OF PUBLICATIONS ARE DESIGNATED AS FOLLOWS:

CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES.
SEP. - SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.

- | Number | Title |
|--------------|---|
| CFS-2433 | New England Fisheries, 1959 Annual Summary, 8 pp. |
| CFS-2435 | Gulf Fisheries, 1959 Annual Summary, 7 pp. |
| CFS-2439 | Middle Atlantic Fisheries, 1959 Annual Summary, 6 pp. |
| CFS-2444 | Chesapeake Fisheries, 1959 Annual Summary, 7 pp. |
| CFS-2448 | Frozen Fish Report, November 1960, 8 pp. |
| CFS-2449 | Maryland Landings, October 1960, 3 pp. |
| CFS-2451 | Fish Meal and Oil, October 1960, 2 pp. |
| CFS-2456 | Alabama Landings, September 1960, 2 pp. |
| CFS-2457 | Mississippi River Fisheries, 1959 Annual Summary, 8 pp. |
| CFS-2458 | New York Landings, October 1960, 4 pp. |
| CFS-2459 | Ohio Landings, October 1960, 2 pp. |
| CFS-2461 | Virginia Landings, October 1960, 3 pp. |
| CFS-2465 | Manufactured Fishery Products, 1959 Annual Summary, 7 pp. |
| CFS-2469 | Maine Landings, October 1960, 3 pp. |
| Sep. No. 612 | Gulf of Mexico Trawl Fishery for Industrial Species. |
| Sep. No. 613 | Composition of Commercially-Important Fish from New England Water: 3 - Part I - Proximate Analyses of Cod, Haddock, Atlantic Ocean Perch, Butterfish, and Mackerel. |

Your Fishery Resources and the Fish and Wildlife Service, 8 pp., illus., processed. A folder outlining the work of the Bureau of Commercial Fisheries in assisting the fishing industry to "farm the sea," market its catch, find new uses for fishery products, and conserve the resources of inland lakes and rivers. Also mentions other duties of the Bureau such as research in nutrition, management of the Pribilof Island seal herd, and technical assistance during the negotiation of international treaties concerning fisheries.

THE FOLLOWING MARKET NEWS LEAFLETS ARE AVAILABLE FROM THE BRANCH OF MARKET NEWS, BUREAU OF COMMERCIAL FISHERIES, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON 25, D. C.

- | Number | Title |
|--------|---|
| MNL-39 | Turkey's 1959 Salt Water Fish Landings. |
| MNL-41 | Chile's Fish Meal and Oil Plants. |

THE FOLLOWING PUBLICATIONS ARE AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED.

(Baltimore) Monthly Summary--Fishery Products, December 1960, 8 pp. (Market News Service, U. S. Fish and Wildlife Service, 400 E. Lombard St., Baltimore 2, Md.) Receipts of fresh- and salt-water fish and shellfish at Baltimore by species and by states and provinces; total receipts by species and comparisons with previous years; and wholesale prices on the Baltimore market; for the month indicated.

California Fisheries, 1959, by V. J. Samson, 41 pp. (Market News Service, U. S. Fish and Wildlife Service, Rm. 208, Post Office Bldg., San Pedro, Calif.) A review of 1959 trends and conditions in the California fisheries, including a resume of American Tuna Boat Association tuna auction sales. Among the subjects discussed is the tuna fishery--cannery receipts; albacore fishery, bait boat-clipper, and tuna purse-seine fleets; canned pack; imports; prices; canned tuna market conditions and prices; and changes in the fleets. Also discussed are the sardine fishery and case pack; the mackerel fishery, pack, and prices; the anchovy fishery; canned pet food pack; whaling industry; and fishing seasons in major fisheries. Included in the statistical tables are data on tuna and tunalike fish--canners' receipts, domestic landings, cannery receipts of frozen imported tuna, and canned pack, 1957-59; sardine landings, canned pack, and meal and oil produced, 1959 and 1958 seasons; and the cannery receipts and pack of mackerel and jack mackerel, 1957-59. Also included are data on cannery receipts of raw materials and production of anchovies, herring, squid, pet food, and meal and oil; freezings and cold-storage holdings of fish and shellfish; landings in the Eureka and San Pedro-Santa Monica areas; and imports of fishery products into Arizona and California Customs Districts, 1958-59.

California Fishery Market News Monthly Summary, Part II - Fishing Information, December 1960, 11 pp., illus. (U. S. Bureau of Commercial Fisheries, Biological Laboratory, P. O. Box 6121, Pt. Loma Station, San Diego 6, Calif.) Discusses the successful use of sonar on yellowfin tuna in the South Atlantic Ocean. Also contains sea-surface temperature charts, Eastern Pacific Ocean; and other pertinent data; for the month indicated.

(Chicago) Monthly Summary of Chicago's Fresh and Frozen Fishery Products Receipts and Wholesale Market Prices, December 1960, 19 pp. (Market News Service, U. S. Fish and Wildlife Service, 565 W.

Washington St., Chicago 6, Ill.) Receipts at Chicago by species and by states and provinces for fresh- and salt-water fish and shellfish; and wholesale prices for fresh and frozen fishery products; for the month indicated.

Gulf Monthly Landings, Production, and Shipments of Fishery Products, October 1960, 8 pp. (Market News Service, U. S. Fish and Wildlife Service, 609-611 Federal Bldg., New Orleans 12, La.) Gulf States shrimp, oyster, finfish, and blue crab landings; crab meat production; LCL express shipments from New Orleans; wholesale prices of fish and shellfish on the New Orleans French Market; and sponge sales; for the month indicated.

Halibut and Troll Salmon Landings and Ex-vessel Prices for Seattle, Alaska Ports and British Columbia, 1960-1958, 34 pp. (Market News Service, U. S. Fish and Wildlife Service, Pier 42 So., Seattle 4, Wash.) Lists the landings and ex-vessel prices of halibut and troll salmon at leading United States Pacific Coast ports, and halibut landings and ex-vessel prices at leading British Columbia ports, for 1959 and 1960.

Monthly Summary of Fishery Products Production in Selected Areas of Virginia, North Carolina, and Maryland, December 1960, 4 pp. (Market News Service, U. S. Fish and Wildlife Service, 18 So. King St., Hampton, Va.) Fishery landings and production for the Virginia areas of Hampton Roads, Lower Northern Neck, and Eastern Shore; the Maryland areas of Crisfield, Cambridge, and Ocean City; and the North Carolina areas of Atlantic, Beaufort, and Morehead City; together with cumulative and comparative data; for the month indicated.

New England Fisheries--Monthly Summary, December 1960, 22 pp. (Market News Service, U. S. Fish and Wildlife Service, 10 Commonwealth Pier, Boston 10, Mass.) Reviews the principal New England fishery ports, and presents food fish landings by ports and species; industrial fish landings and ex-vessel prices; imports; cold-storage stocks of fishery products in New England warehouses; fishery landings and ex-vessel prices for ports in Massachusetts (Boston, Gloucester, New Bedford, Provincetown, and Woods Hole); Maine (Portland and Rockland); Rhode Island (Point Judith), and Connecticut (Stonington); frozen fishery products prices to primary wholesalers at Boston, Gloucester, and New Bedford; and landings and ex-vessel prices for fares landed at the Boston Fish Pier and sold through the New England Fish Exchange; for the month indicated.

New England Importers and Brokers of Imported Fishery Products, 1961, 8 pp. (Market News Service, U. S. Fish and Wildlife Service, 10 Commonwealth Pier, Boston 10, Mass.) A revised list of the importers and brokers of foreign fishery products in the Boston and New England area. The list includes the name, address, types of products, and shipping countries.

(Seattle) Washington, Oregon, and Alaska Receipts and Landings of Fishery Products for Selected Areas and Fisheries, Monthly Summary, December 1960, 10 pp. (Market News Service, U. S. Fish and Wildlife Service, Pier 42 South, Seattle 4, Wash.) Includes landings and local receipts, with ex-vessel and wholesale prices in some instances, as reported by Seattle and Astoria (Oreg.) wholesale

dealers; also Northwest Pacific halibut landings; and Washington shrimp landings; for the month indicated.

Marketing Feasibility Study of Radiation Processed Fishery Products, WASH-1030, 35 pp., illus., processed. (Bureau of Commercial Fisheries, U. S. Fish and Wildlife Service, Washington 25, D. C.) This report has been prepared as a result of a study conducted by the Bureau of Commercial Fisheries for the Atomic Energy Commission. The purpose of the study was to determine, from various segments of the fishing and allied industries, the acceptability and the marketing feasibility of radiation-processed fishery products. Findings showed that expansion of markets for fishery products ranked first among the advantages resulting from irradiation; improved quality control ranked second. Results of the study also indicated that many individuals expect the radiation process to revolutionize completely the fresh fish industry, leading to the development of new markets and the expansion of old ones.

THE FOLLOWING ENGLISH TRANSLATIONS OF FOREIGN LANGUAGE ARTICLES ARE NOT FOR GENERAL DISTRIBUTION BUT ARE AVAILABLE FOR REFERENCE ONLY FROM THE OFFICE INDICATED:

FROM THE U. S. FISH AND WILDLIFE SERVICE,
BUREAU OF COMMERCIAL FISHERIES,
P. O. BOX 3830, HONOLULU, HAWAII, THE FOLLOWING:

An Investigation of the Waters Adjacent to Ponape, 10 pp., Translation No. 12, illus., processed, August 9, 1949. (Translated from Fisheries Experiment Station Progress Report No. 1, 1923-35, December 1937.)

On the Gonads of Skipjack from Palao Waters, by Kizo Matsui, Translation No. 19, 7 pp., illus., processed, August 30, 1949. (Translated from South Sea Science, vol. 5, no. 1, September 1942, pp. 117-122.)

The Larval and Juvenile Stages of the Plecostei, by Kamakichi Kishinouye, Translation No. 20, 4 pp., processed, September 1, 1949. (Translated from Suisan Gakkai Ho, vol. 3, no. 2, December 1919.)

List of Translations Reproduced for Distribution to Sept. 1, 1949, by W. G. VanCampen and B. M. Shimada, Translation No. 22, 4 pp., processed, September 1, 1949.

Observations on the Skipjack Fishing Grounds, by Kamakichi Kishinouye, Translation No. 21, 4 pp., processed, September 1, 1949. (Translated from Suisan Gakkai Ho, vol. 4, no. 2, December 1924, pp. 87-92.)

On the Search for Southern Tuna Fishing Grounds, by Yoshinori Ban, Translation No. 13, 12 pp., illus., processed, August 1949. (Translated from South Sea Fisheries, vol. 7, no. 9, September 25, 1941, pp. 10-21.)

A Survey of Tuna Grounds in Equatorial Waters, by Tokuzo Uehara, Translation No. 14, 5 pp., illus., processed, August 12, 1949. (Translated from South Sea Fishery News, vol. 5, no. 3, June 25, 1941, pp. 13-17.)

A Survey of Tuna Fishing Grounds in the Marshall and Caroline Islands, by Kenzo Ikebe, Translation No. 15, 5 pp., illus., processed, August 1949. (Translated from South Sea Fishery News, vol. 5, no. 1, 1941, pp. 6-9.)

A Symposium on the Investigation of Tuna and Skipjack Spawning Grounds, Translation No. 16, 12 pp., processed, August 23, 1949. (Translated from South Sea Science, vol. 4, no. 1, July 1941, pp. 64-75.)

A Tuna Survey in Palau Waters (Late 1940), Translation No. 24, 5 pp., processed, September 8, 1949. (Translated from South Sea Fishery News, vol. 5, no. 4, September 2, 1941, pp. 2-4.)

FROM THE ICHTHYOLOGICAL LABORATORY,
BUREAU OF COMMERCIAL FISHERIES,
RM. 71, U. S. NATIONAL MUSEUM,
WASHINGTON 25, D. C., THE FOLLOWING:

Materials on the Structure of the Fish Brain. 1--Structure of the Brain of Codfishes, by A. N. Svetovidov, 33 pp., processed. (Translated from Trudy Zoologicheskogo Instituta Akademii Nauk SSSR, vol. 13, 1953, pp. 390-419.)

The Morphology and Classification of the Northern Blennoid Fishes (Stichaeidae, Blennioidei, Pisces), by V. M. Makushok, 25 pp., illus., processed. (Translated from Trudy Zoologicheskogo Instituta Akademii Nauk SSSR, vol. 17, 1955, pp. 346-348.)

Note on *Phycis borealis* Saemundsson (Pisces, Gadidae), 3 pp., processed. (Translated from Trudy Zoologicheskogo Instituta Akademii Nauk SSSR, vol. 17, 1955, pp. 346-348.)

FROM THE U. S. FISH AND WILDLIFE SERVICE, BUREAU OF COMMERCIAL FISHERIES, BIOLOGICAL LAB., SEATTLE, WASH., THE FOLLOWING:

Chemical Studies on the Body Tissues of the Salmon, *ONCORHYNCHUS KETA*, after Spawning, by T. Uno, T. Tokunaga, and M. Nakamura, Translation Series No. 29, 11 pp., processed, April 8, 1960. (Translated from Bulletin of the Hokkaido Regional Fisheries Research Laboratory, no. 14, September 1956, pp. 89-95.)

THE FOLLOWING SERVICE PUBLICATION IS FOR SALE AND IS AVAILABLE ONLY FROM THE SUPERINTENDENT OF DOCUMENTS, WASHINGTON 25, D. C.

Apparent Abundance of the Pilchard (SARDINOPS CAERULEA) Off Oregon and Washington, 1935-43, as Measured by the Catch per Boat, by John C. Marr, Fishery Bulletin 52 (From Fishery Bulletin of the Fish and Wildlife Service, vol. 51), 17 pp., illus., printed, 15 cents, 1950.

MISCELLANEOUS PUBLICATIONS

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM. CORRESPONDENCE REGARDING PUBLICATIONS THAT FOLLOW SHOULD BE ADDRESSED TO THE RESPECTIVE ORGANIZATION OF PUBLISHER MENTIONED. DATA ON PRICES, IF READILY AVAILABLE, ARE SHOWN.

AGAR:

Agar from *DIGENEA SIMPLEX*, by Harold J. Humm, 6 pp., illus., printed. (Reprinted from Florida State University Studies, Contributions to Science.) Florida State University, Tallahassee, Fla.

ALGAE:

Estudios sobre Algas Industriales Espanolas. 1--Influencia del Tratamiento Previo sobre el Rendimiento

y Calidad del Agar Obtenido del *Gelidium* (Studies on Spanish Industrial Algae. I--Influence of Processing Conditions on the Yield and Quality of the Agar Obtained from *Gelidium*), by Jesus Aravio-Torre y Javier Villegas, 13 pp., illus., printed in Spanish. (Reprinted from Boletin del Instituto Espanol de Oceanografia, no. 97, May 1959.) Instituto Espanol de Oceanografia, Ministerio de Marina, Madrid, Spain, 1959.

ANTIBIOTICS:

"Studies on the Influence of Treatment Immediately after Catching upon the Quality of Fish Flesh. IV--Use of Chlortetracycline Ice for the Preservation of Sauri, *Cololabis saira* Brevoort," by Y. Tsuchiya, T. Nonura, and M. Murase, article, Bulletin of the Japanese Society of Scientific Fisheries, vol. 25, November 1959, pp. 569-572, illus., printed in Japanese with English abstract. Japanese Society of Scientific Fisheries, c/o Tokyo University of Fisheries, Shiba-kaigandori 6-chome, Tokyo, Japan.

"Thermal and Nonthermal Degradation of Acronize Chlortetracycline in Fish and Some Shellfish," by E. F. Kline and others, Food Technology, vol. 14, June 1960, pp. 305-508, printed. Food Technology, The Garrard Press, 510 No. Hickory St., Champaign, Ill.

BIOCHEMISTRY:

"Adsorption of the Ferric Ion by Weakly Acidic Resins. Preferential Uptake of the Ferric Ion by Alginate Acid," by M. Seno and T. Yamabe, article, Bulletin of the Chemical Society of Japan, vol. 33, May 1960, pp. 590-596, printed. Chemical Society of Japan, No. 5, 1-chome, Surugadai, Kanda Chiyoda-ku, Tokyo, Japan.

"Studies on the Browning of Fish Flesh. I--Browning of White Flesh by Heat," by Toyoki Ono and Fumio Nagayama, article, Bulletin of the Japanese Society of Scientific Fisheries, vol. 24, no. 10, 1959, pp. 833-836, printed in Japanese with English abstract. Japanese Society of Scientific Fisheries, c/o Tokyo University of Fisheries, Shiba-kaigandori 6-chome, Tokyo, Japan.

CALIFORNIA:

Inshore Fishes of California, by John L. Baxter, 80 pp., illus., printed, 35 cents. California Department of Fish and Game, Sacramento, Calif., 1960. Presents information on California's inshore fish and discusses environmental factors, adaptations of inshore fish, management, classification, tide pool fish, coastal access, and pier fishing. Also contains detailed descriptions of California's principal inshore species of fish. Slanted primarily toward the sports fisherman, but also of considerable interest to people in the fishing industry and related fields.

CANADA:

Journal of the Fisheries Research Board of Canada, vol. 17, no. 6, December 1960. Queen's Printer and Controller of Stationery, Ottawa, Canada. Includes, among others, these articles: "Age, Growth and Sexual Maturity of Cod (*Gadus morhua* L.) in the Newfoundland Area, 1947-1950," by A. M. Fleming; "Keeping Quality of Pacific Coast Dogfish. II," by B. A. Southcott and others; "Economic Study of the Herring Fishery of Charlotte County, New Brunswick, 1956-1957," by W. F. Doucet; "The Effect of Marine Products on the Blood Cholesterol Levels in Man and in Animals. A Review," by J.D. Wood; "Seasonal

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

Variation in the Collagen Content of Pacific Herring Tissues," by J. R. McBride, R. A. MacLeod, and D. R. Idler; and "Further Study of Larval Herring (*Clupea harengus* L.) in the Bay of Fundy and Gulf of Maine," by S. N. Tibbo and J. E. HenriLegare.

CANNING:

"Preparation of Fish for Canning," by W. A. Empey, article, *Food Preservation Quarterly*, vol. 20, March 1960, pp. 8-12, printed. Food Preservation Quarterly, Commonwealth Scientific & Industrial Research Organization, Division of Food Preservation and Transport, Sydney, Australia.

CARIBBEAN:

"Los Problemas de la Pesca en el Caribe" (Caribbean Fishery Problems), by Federico Gomez de la Maza, article, *Puntal (Revista Maritima y Pesquera)*, vol. 7, no. 80, November 1960, pp. 20-21, illus., printed in Spanish. Puntal, Apartado de Correos 316, Alicante, Spain.

CLAM SHELLS:

"Clam Shells Kill Waste Acid," by C. S. Cronan, article, *Chemical Engineering*, vol. 67, June 13, 1960, p. 78, printed. Chemical Engineering, McGraw-Hill Publishing Co., 330 W. 42nd St., New York 36, N. Y.

COD:

"The Acid-Soluble Collagen of Cod Skin," by E. Gordon Young and J. W. Lorimer, article, *Archives of Biochemistry and Biophysics*, vol. 88, June 1960, pp. 373-381, printed. Archives of Biochemistry and Biophysics, c/o Academic Press, 111 Fifth Ave., New York 3, N. Y.

"Kinetics of Phosphate-Buffered, Ribose-Amino Reactions at 40° and 70% Relative Humidity: Systems Related to the 'Browning' of Dehydrated and Salt Cod," by N. R. Jones, article, *Journal of the Science of Food and Agriculture*, vol. 10, November 1959, pp. 615-624, printed. Journal of the Science of Food and Agriculture, The Society of Chemical Industry, 14 Belgrave Square, London SW1, England.

"Studies on the Proteins of Fish Skeletal Muscle. 7--Denaturation and Aggregation of Cod Myosin," by J. J. Connell, article, *The Biochemical Journal*, vol. 75, June 1960, pp. 530-538, printed. The Biochemical Journal, Cambridge University Press, Bentley House, 200 Euston Rd., London NW1, England.

CRUSTACEA:

The Physiology of Crustacea. Vol. 1: Metabolism and Growth, edited by Talbot H. Waterman, 687 pp., printed, \$22. Academic Press, Inc., 125 E. 23rd St., New York 10, N. Y., 1960.

CUBA:

"Fauna Acompañante en la Pesquería de Camarones" (Incidental Fauna of the Shrimp Fishery), by Captain Fritz, article, *Mar y Pesca*, vol. 4, nos. 1 and 2, November-December 1960, pp. 32-33, illus., printed in Spanish. Departamento de Pesca, Edificio I.N.R.A., Onceno Piso, Plaza Cívica, Havana, Cuba.

Statistics of Fishery Products, Year 1959 (Estadísticas de Productos Pesqueros, Año 1959), 38 pp., processed in Spanish. Departamento de Pesca, I.N.R.A.,

Havana, Cuba, 1960. Contains details of the quantity and value of Cuba's production, export, and import of fishery products in 1959.

DOLPHIN:

Auditory Scanning in the Dolphin, by W. N. Kellogg, Contribution No. 110, 3 pp., illus., printed. (Reprinted from *The Psychological Record*, vol. 10, no. 1, January 1960, pp. 25-27.) Oceanographic Institute, Florida State University, Tallahassee, Fla., 1960.

ENZYMES:

"Digestive Enzymes of Fish and Seasonal Changes in Their Activity," by A. V. Ananichev, article, *Biochemistry (U.S.S.R.)*, vol. 24, November-December 1959, pp. 952-958, printed in Russian. Biochemistry (U.S.S.R.), Consultants Bureau, Inc., 227 W. 17 St., New York 11, N. Y.

FACTORY TRAWLER:

"Trawling Operations on Fairtry II," by Geoffrey Trout, article, *World Fishing*, vol. 9, no. 12, December 1960, pp. 35-38, illus., printed. World Fishing, John Trundell (Publishers) Ltd., St. Richard's House, Eversholt St., London NW1, England. Consists mainly of photos showing operations on board the factory trawler Fairtry II during a trip to the Northwest Atlantic. A number of "shots" depict the functioning of the deck gear. The text describes the processing of the fish from landing to unloading of the blocks of frozen fillets at dock-side.

FACTORYSHIP:

"La Era de los Navios-Factoria" (The Era of the Factoryships), by F. Boixiere, article, *Puntal (Revista Maritima y Pesquera)*, vol. 7, no. 80, November 1960, pp. 2-4, illus., printed in Spanish. Puntal, Apartado de Correos 316, Alicante, Spain.

FILLET SLICING MACHINE:

A Machine to Slice Cod Fillets, by H. E. Power and H. Fougere, New Series Circular No. 6, 7 pp., illus., processed. Fisheries Research Board of Canada, Technological Station, Halifax, N. S., Canada, October 1960. Experiments have shown that a substantial increase in the efficiency of candling cod fillets for parasites can be expected if the fillets are sliced longitudinally into slices 1/2-inch thick before candling. A cod-filleting machine has been designed and developed at the Halifax, Nova Scotia, Technological Station. The machine and its operation are described in this booklet.

FISH COOKERY:

Maine Sardine Recipes, 12 pp., illus., printed. Maine Sardine Council, 15 Grove St., Augusta, Me., 1961. A miniature booklet of 20 recipes using sardines in sandwiches, salads, pizza, and other dishes. Includes a chart which compares the nutritive and health values of Maine sardines with other snack and convenience foods. Attractively illustrated in full color.

FISH MEAL:

"Nutrition Symposium of National Fisheries Institute: Fish Meal Quality," by Steele Culbertson, article, *Feedstuffs*, vol. 32, May 14, 1960, pp. 56, 65-66, printed. Feedstuffs, Miller Publishing Co., 118 So. 6th St., Minneapolis 2, Minn.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

"Preparation of 'Galongong' (*Decapterus macrostoma*) Fish Meal and Its Nutritive Value," by O. N. Gonzalez, S. V. Bersamin, and J. I. Sulit, article, Indo-Pacific Fisheries Council, Proceedings of 6th Session, pp. 283-286, printed. Indo-Pacific Fisheries Council Secretariat, Food and Agriculture Organization of the United Nations, Regional Office for Asia and the Far East, Bangkok, Thailand, 1956.

FOOD AND AGRICULTURE ORGANIZATION:

Current Bibliography for Aquatic Sciences and Fisheries, Annual Indexes, 1959, 181 pp., processed. Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy.

List of Films and Filmstrips on Fisheries and Related Subjects, by E. Heen, 163 pp., processed. Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy, 1960. Contains descriptions of films on fishing gear and methods, vessels, fish processing, and fisheries science in general. This revised and augmented edition was compiled from film catalogues, and fisheries trade, government, and other publications. Most of the films listed are obtainable from member governments. The FAO itself, however, owns a limited number which are primarily for use in fisheries schools and training centers and at international meetings.

Yearbook of Fishery Statistics, 1959 (Production), vol. XI, 386 pp., illus., processed in English, French, and Spanish, \$4. Food and Agriculture Organization of the United Nations, Rome, Italy, 1960. (For sale by the Columbia University Press, International Documents Service, 2960 Broadway, New York 27, N. Y.) This edition contains all sections that appeared in the 1958 edition except for that pertaining to fishing craft. This is the first Production Yearbook in which it has been possible to make modifications in accordance with the recommendations of the Expert Meeting on Fishery Statistics in the North Atlantic Area, held in Edinburgh in September 1959. Improvements and refinements were made in the maps and graphs section, with the aim of standardizing as far as possible their presentation. The total world catch of fishery products for 1959 is estimated at 35 million metric tons as compared to 33.7 million tons for 1958.

FRANCE:

"La Flotte de Peche Francaise" (The French Fishing Fleet), article, France Peche, vol. 5, no. 45, November 1960, pp. 33-35-36, illus., printed in French. France Peche, Tour Sud-Est, Rue de Guemene, Lorient, France.

"Le Marche Francais du Poisson" (The French Market for Fish) article, France Peche, vol. 5, no. 45, November 1960, pp. III-III, illus., printed in French. France Peche, Tour Sud-Est, Rue de Guemene, Lorient, France.

"Un Nouveau Systeme de Peche par l'Arriere Mis au Point a Cherbourg" (A New Method of Stern Fishing Being Tried at Cherbourg), article La Peche Maritime, vol. 39, no. 992, November 1960, pp. 703-705-707, illus., printed in French. La Peche Maritime, 190, Boulevard Hausmann, Paris, France.

GEAR:

"Experimental Use of Multiple Mechanization Aboard SRT-1044," by V. P. Trofimov, article, Rybnoe Khoziaistvo, vol. 35, no. 9, 1959, pp. 39-46, illus., printed in Russian. Rybnoe Khoziaistvo, VNIRO Glavniproekta, pri Gosplanie S.S.S.R., Moscow, U.S.S.R.

"New Equipment for Mechanization of Drift-Net Fishing Aboard Medium Trawlers," by A. A. Karasik, article, Rybnoe Khoziaistvo, vol. 34, no. 7, 1958, pp. 28-31, illus., printed in Russian. Rybnoe Khoziaistvo, VNIRO, Glavniproekta, pri Gosplanie S.S.S.R., Moscow, U.S.S.R.

"Net-Shaking Machine, VSM-2," by A. A. Shabanov and V. P. Ivashev, article, Rybnoe Khoziaistvo, vol. 34, no. 7, 1958, pp. 32-34 illus., printed in Russian. Rybnoe Khoziaistvo, VNIRO Glavniproekta, pri Gosplanie S.S.S.R., Moscow, U.S.S.R.

GENERAL:

"On the Problem of New Fishing Prospects on the Continental Shelf and in the High Seas," by U. Schmidt, H. J. Aurich, and E. H. Rogalla, article, Information fur die Fischwirtschaft, vol. 6, 2/Annex I, 1959, pp. 33-53, illus., printed in German. Bundesforschungsanstalt fur Fischerei, Neuer Wall 72, Hamburg 36, Germany.

GREENLAND:

"East Greenland Fishing Possibilities," article, World Fishing, vol. 9, no. 12, December 1960, p. 55, illus., printed, World Fishing, John Trundell (Publishers) Ltd., St. Richards House, Eversholt St., London NW1, England. With the scarcity of cod on other, more familiar grounds, interest in fishing grounds off East Greenland has grown recently. This article is an account of a cruise made to the area early in 1960 by the British research vessel Ernest Holt. The report of the voyage indicates that fishing in waters of over 130 fathoms during late autumn and spring would probably be worthwhile.

HERRING:

"Amino-Acid Composition of Herring (*Clupea harengus*) and Herring Meal. Destruction of Amino-Acids during Processing," by Gjermund Boge, article, Journal of the Science of Food and Agriculture, vol. II, July 1960, pp. 362-365, printed. Journal of the Science of Food and Agriculture, The Society of Chemical Industry, 14 Belgrave Square, London SW1, England.

"On Atlantic-Scandinavian Herring Resources and Their Utilization," by Ju. Marti and S. S. Fedorov, article, Rybnoe Khoziaistvo, vol. 35, no. 5, 1959, pp. 17-26, illus., printed in Russian. Rybnoe Khoziaistvo, VNIRO Glavniproekta, pri Gosplanie S.S.S.R., Moscow, U.S.S.R.

On the Causes of the Great Fluctuations in the Herring Fishery on the West Coast of Sweden, by K. A. Andersson, Series Biology Report No. 12, 52 pp., illus., printed. Fishery Board of Sweden, Institute of Marine Research, Lysekil, Sweden, 1960.

INDUSTRIAL MANAGEMENT:

A Handbook of Small Business Finance, by Ralph B. Tower, Small Business Management Series No. 15,

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

85 pp., illus., printed, 30 cents. Small Business Administration, Washington, D. C., 1960. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) The fourth edition of a handbook on finance for small businesses. The purpose of this booklet is to furnish new owners and inexperienced managers with basic information to help them understand better the financial operations of their businesses. As such, it should aid them in making better use of the financial assistance available to them, particularly from local banks, and guide them in measuring the progress of their operations. Some of the subjects covered are term loans, accounts receivable, and inventory financing; current sources of financial assistance for small manufacturers; and the Small Business Administration's lending and investment programs.

INTERNATIONAL COMMISSIONS:

(International North Pacific Fisheries Commission) Annual Report for the Year 1959, 120 pp., illus., printed. International North Pacific Fisheries Commission, 6640 N. W. Marine Drive, Vancouver 8, B. C., Canada. This is the sixth consecutive annual report of the International North Pacific Fisheries Commission, established by a Convention between Canada, Japan, and the United States on June 12, 1953. It consists of three parts: report of accomplishments of the Commission's annual meeting held in Seattle from November 2 through 7, 1959; summary of administrative activities during the year; and progress reports on research conducted by the member governments under the Commission's program. In 1959 the Commission for the second year studied the salmon, halibut, and herring stocks in the eastern North Pacific to determine whether these stocks continued to meet the abstention qualifications of the Convention, or if changes should be made. No recommendations for changes in abstention for salmon or halibut stocks were made. Herring stocks, however, were recommended for removal from abstention. The Commission took a number of steps toward expediting the collation and publication of the results of its research program. Studies of the king crab population of the eastern Bering Sea were continued by Japanese and United States scientists, acting in accordance with a request made in 1954 by the latter country.

(North Pacific Fur Seal Commission) Proceedings of the Third Annual Meeting, January 25-27, 1960, Moscow, U.S.S.R., 40 pp., processed. Secretary, North Pacific Fur Seal Commission, Department of the Interior, Washington 25, D. C., March 1960. The North Pacific Fur Seal Commission was established in January 1958, during a meeting held in Washington, D. C. The Commission was organized in accordance with the Interim Convention on Conservation of North Pacific Fur Seals, signed in Washington on February 9, 1957, by the Governments of Canada, Japan, the U.S.S.R., and the United States. The Convention came into force on October 14, 1957. This report contains sections on the proceedings of the Third Annual Meeting, summaries of fur-seal investigations during 1959, plans for 1960, and administrative report of the Secretary to the Third Meeting. The second and third sections discuss the fur-seal investigations and management programs of the member countries.

JAPAN:

Progress Report of the Cooperative Coastal Important Resources Investigations, 1955, 193 pp., illus., printed in Japanese and English. Fisheries Agency, Hokkaido Regional Fisheries Research Laboratory, Yoichi, Japan, August 1959.

KENYA:

Report on Kenya Fisheries, 1959, 26 pp., illus., printed, 2 s 5 d (about 34 U. S. cents). Ministry of Forest Development, Game and Fisheries, Fisheries Division, Nairobi, Kenya, 1960. Reviews the work done during 1959 on inland fisheries development, a fish culture farm, a trout hatchery, and the trout rivers. The sea fisheries section includes information on landings, marketing, and foreign trade in fresh, chilled, and frozen fish; the production of dried fish and shark; and the marine shell, oyster, shrimp, spiny lobster, and crab fisheries. Fishing investigations and gear development are discussed and several tables on catch statistics and imports are included. A diagram of a native fish trap is shown.

LAW OF THE SEA CONFERENCE:

De Tweede Conferentie van de Verenigde Naties over het Zeerecht, Geneva, 17 Maart-27 April 1960, Proceedings of the Second Conference on the Law of the Sea (March 17-April 27, 1960), 65 pp., printed in Dutch and English, fl. 1.40 (about 37 U. S. cents). Ministerie van Buitenlandse Zaken, The Hague, Netherlands, 1960. Includes discussions of the Law of the Sea Conference of 1958, the opening of the Second Conference and its organization, the Committee of the Whole, and the plenary sessions. The appendix contains the text of the resolution convening the Conference; a note by the Secretary-General outlining the synoptical table of breadth and juridical status of territorial sea and adjacent zones; the proposals of the U.S.S.R., Mexico, the United States, and Canada; and the United States-Canadian proposal. Also contains the statement of the Chairman of the Netherlands Delegation, a table showing how each country voted on the major proposals, and the final act of the Conference.

LINGCOD:

"Lingcod Muscle Phosphomonoesterases. I--Acid Phosphatases that Hydrolyze P-Nitrophenyl Phosphate," by Neil Tomlinson and R. A. J. Warren, article, Canadian Journal of Biochemistry and Physiology, vol. 38, June 1960, pp. 605-612, printed. Canadian Journal of Biochemistry and Physiology, Division of Administration and Awards, National Research Council, Ottawa 2, Canada.

MARINE ALGAE:

"Marine Red Algae. Chemical Properties and Practical Importance. I--Communication: Chemical Composition," by O. J. von Schmid, article, Botanica Marina, vol. 1, nos. 1/2, 1959, pp. 54-64, illus., printed in German. Botanica Marina, Gram, de Gruyter und Co., Hamburg 1, Germany.

Notes on the Marine Algae of Florida. I--The Intertidal Rocks of Marineland, by Harold J. Humm, 7 pp., illus., printed. (Reprinted from Florida State University Studies, no. 7, October 15, 1952.) Oceanographic Institute, Florida State University, Tallahassee, Fla.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

MARINE FISHERIES:

L'Essor de la Pêche Maritime dans les Mers Tropicales (The Scope of the Marine Fishery in Tropical Seas), by Francois Doumenge, 67 pp., illus., printed in French. (Reprinted from Les Cahiers d'Outre-Mer, vol. 13, 1960, pp. 133-199.) Les Cahiers d'Outre-Mer, Palais de la Bourse, Place Gabriel, Bordeaux, France.

MISCELLANEOUS:

"Fish Gathering Effects and Submarine Illumination of the Incandescent and Fluorescent Mercury-Vapour Lamps," by Takaya Kusaka, article, Bulletin of the Japanese Society of Scientific Fisheries, vol. 25, no. 1, 1959, pp. 17-21, illus., printed in Japanese with English abstract. Japanese Society of Scientific Fisheries, c/o Tokyo University of Fisheries, Shiba-kai-gandori 6-chome, Tokyo, Japan.

MULLET:

The Demand for Florida Mullet, by William S. Engelson and Marshall R. Colberg, Contribution No. 69, 12 pp., illus., printed. (Reprinted from Florida State University Studies, no. 22, 1956, pp. 77-88.) Oceanographic Institute, Florida State University, Tallahassee, Fla. Discusses the economists' concept of "demand," consumption of mullet in Florida and elsewhere, methods of collecting data for the economic study of mullet, and analysis of the findings of this study. Data available for 1951 indicated that, "the ease with which new producers can enter the field probably means, however, that the primary effect of an increasing demand will be to increase the number of mullet fishermen rather than their per-capita earnings."

NETS:

"Experimental Fishing Test on the Efficiency of Double Gill Net," by Masatsune Nomura, article, Bulletin of the Japanese Society of Scientific Fisheries, vol. 26, February 1960, p. 103, printed. Japanese Society of Scientific Fisheries, c/o Tokyo University of Fisheries, Shiba-kai-gandori 6-chome, Tokyo, Japan.

NORTH VIETNAM:

Local Industry and Fishing in North Vietnam, by Nguyen Van Dau and Tran Dinh Pho, JPRS 5541, 7 pp., processed. (Translated from Nhan Dan, no. 2264, May 31, 1960, p. 3.) U. S. Joint Publications Research Service, 205 E. 42nd St., Suite 300, New York 17, N. Y., September 19, 1960. Photocopies of this report are for sale by Photoduplication Service, Library of Congress, Washington 25, D. C.)

NORWAY:

"Stortalernes Lønnsomhet 1959" (The Value of Large Trawlers, 1959), by A. Holm, article, Fiskets Gang, vol. 46, no. 48, December 1, 1960, pp. 673-680, illus., printed in Norwegian. Fiskets Gang, Postgiro nr. 691 81, Bergen, Norway.

NUTRITION:

Nutritive Value of Foods, Home and Garden Bulletin No. 72, 30 pp., illus., printed, 20 cents. U. S. Department of Agriculture, Washington, D. C., September 1960. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) A table of nutritive values of 10 classes of

food makes up the greater part of this bulletin. Data are included on the water, caloric, protein, fat, fatty acid, carbohydrate, mineral, and vitamin content of several types and species of fish and shellfish.

OCEANOGRAPHY:

Annual Report of the Oceanographic Institute of the Florida State University, Fiscal Year 1959-1960, 27 pp., processed. The Oceanographic Institute, Florida State University, Tallahassee, Fla., November 1, 1960. Describes the functions and activities of the Oceanographic Institute during the fiscal year July 1, 1959, through June 30, 1960. Emphasis is placed on research projects completed or currently under way.

Oceanographic Survey of the Continental Shelf Area of Southern California, Publication No. 20, 568 pp., illus., processed. State Water Pollution Control Board, Rm. 316, 1227 O St., Sacramento 14, Calif., 1959.

"Oceanography and Fisheries," by J. L. Kask, article, Canadian Fisheries Annual, 1960, pp. 49-54, printed. Canadian Fisheries Annual, National Business Publications, Ltd., Gardenvale, Quebec, Canada.

OYSTERS:

The Glorious Oyster, edited by Hector Bolitho, 191 pp., illus., printed, 25 s. (about US\$3.50). Sidgwick and Jackson, Ltd., 1 Tavistock Chambers, Bloomsbury Way, London WC1, England, 1960.

Oysters, by C. M. Yonge, 226 pp., illus., printed, 21 s. (about US\$2.95). William Collins, Sons and Co., Ltd., 14 St. James' Place, London SW, England, 1960.

Some Additional Differences Between CRASSOSTREA VIRGINICA and OSTREA EQUESTRIS in the Gulf of Mexico Area, by R. Winston Menzel, 6 pp., processed. (Reprinted from Proceedings of the National Shellfisheries Association, vol. 46, pp. 76-81.) Oceanographic Institute, Florida State University, Tallahassee, Fla.

POLLUTION:

First Report of Pollution-Caused Fish Kills Through September 30, 1960, 6 pp., processed. Division of Water Supply and Pollution Control, Public Health Service, U. S. Department of Health, Education, and Welfare, Washington 25, D. C., 1960. This is the first quarterly report of fish killed by pollution in the United States. It marks the beginning of a long-term cooperative effort by the 50 states, the U. S. Public Health Service, and the U. S. Fish and Wildlife Service. This project will be an effective means of obtaining additional basic information needed to determine effects of pollution on the Nation's water resources. This report is cumulative, including reports of "fish kills" caused by pollution during 1960 until September 30. Future reports also will be cumulative.

PORPOISE:

Size Discrimination by Reflected Sound in a Bottle-Nose Porpoise, by W. N. Kellogg, Contribution No. 117, 6 pp., illus., printed. (Reprinted from The Journal of Comparative and Physiological Psychology, vol. 52, no. 5, October 1959, pp. 509-514.) Oceanographic Institute, Florida State University, Tallahassee, Fla.

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POULTRY RATIONS:

"Defatted Starfish Meal as Source of Nutrients in Poultry Rations," by Ezra Levin and others, article, *Poultry Science*, vol. 39, May 1960, p. 646, printed. Poultry Science Association, Kansas State College, Manhattan, Kans.

PRESERVATION:

"Experiences in the Preservation at Sea of Herring for Fish Meal and Oil Industry. I--Drainage before Preservation in Partitioned Fish Holds; II--Use of Preservatives and Results Obtained," by E. Arnesen, articles, *Fiskaren*, vol. 36, no. 47, pp. 1, 7 and no. 40, p. 4, printed in Norwegian. Fiskaren, A. S. Bergens Tidende og J. W. Eides, Boktrykkeri, Bergen, Norway.

PROCESSING:

"A New Way of Drying Fish," article, *World Fishing*, vol. 9, no. 12, December 1960, pp. 64, 67-68, illus., printed. World Fishing, John Trundell (Publishers) Ltd., St. Richard's House, Eversholt St., London NW1, England. Accelerated freeze-drying of food is a process which has been developed by British scientists and which is now being handled commercially. This article explains what the process is and its advantages as a method of preserving fish, particularly in underdeveloped countries. It might also have a factoryship application.

SALMON:

"Biochemical Studies on Sockeye Salmon during Spawning Migration. XII--Liver Glycogen," by Violet M. Chang and D. R. Idler, article, *Canadian Journal of Biochemistry and Physiology*, vol. 38, June 1960, pp. 553-558, printed. Canadian Journal of Biochemistry and Physiology, Division of Administration and Awards, National Research Council, Ottawa 2, Canada.

"A Biochemical Study of Coho Salmon (*Oncorhynchus kisutch*) Maturing Sexually in an Aquarium," by Robert A. MacLeod, R. E. E. Jonas, and E. Onofrey, article, *Journal of the Fisheries Research Board of Canada*, vol. 17, May 1960, pp. 323-335, printed. Queen's Printer and Controller of Stationery, Ottawa, Canada.

SAURY:

"Decomposition of Peroxides in Fats with Particular Reference to Those in Saury Oil," by H. Watanabe and Y. Toyama, article, *Memoirs of the Faculty of Engineering, Nagoya University*, no. 10, 1958, pp. 95-104, printed in Japanese. Nagoya University, Furo-cho, Chikusa-ku, Nagoya, Japan.

SEALS:

"The Grey Seal and British Fisheries," article, *Nature*, vol. 188, no. 4753, December 3, 1960, pp. 773-774, printed. Nature, St. Martin's Press, Inc., 175 Fifth Ave., New York 10, N. Y.

SEAWEED:

Chemical and Growth Gradients of LAMINARIA CLOUSTONI Edm. (L. HYPERBOREA Forst.), by W. A. P. Black, W. D. Richardson, and F. T. Walker, 13 pp., printed, 3 s. (about 42 U.S. cents). (Reprinted from *The Economic Proceedings of the Royal Dublin Society*, vol. 4, no. 8, 1959, pp. 137-149.) The Royal Dublin Society, Ballsbridge, Dublin, Ireland, 1959.

"Seaweed Industry on the Move," article, *Chemical and Engineering News*, vol. 38, June 20, 1960, p. 138, printed. Chemical and Engineering News, American Chemical Society, 1801 K St., N. W., Washington 6, D. C.

SHRIMP:

Exploratory Prawn Trawling in Eastern Australian Waters, 125 pp., illus., printed. Commonwealth Fisheries Office, Dept. of Primary Industry, Canberra, Australia, 1959. Details are given of the result of exploratory shrimp trawling carried out during the period July 1957 to August 1958 off the east coast of Australia, particularly off the coast of Queensland. The distribution of the more important species of shrimp obtained during the survey are also discussed. Descriptions and plans of the main types of shrimp trawls used during the survey are also included. In addition, there are good photographs of 14 species of *Penaeus* taken in those waters.

"A Note on the Bacteriology of Prawns and Their Preservation by Freezing," by A. Sreenivasan, article, *Journal of Scientific and Industrial Research*, vol. 18C, June 1959, pp. 119-120, printed. Journal of Scientific and Industrial Research, Old Mill Rd., New Delhi 2, India.

SQUID:

"The Effect of ATP on the Viscosity of Squid Actomyosin," by Juichiro J. Matsumoto, article, *Bulletin of the Japanese Society of Scientific Fisheries*, vol. 24, no. 5, 1958, pp. 355-362, printed. Japanese Society of Scientific Fisheries, c/o Tokyo University of Fisheries, Shiba-kaigandori 6-chome, Tokyo, Japan.

"On the Solubility in Water of the Fibrous Proteins of the Squid Muscle Phase-Contrast and Electron-Microscopic Study," by J. J. Matsumoto and E. Okuyama, article, *Bulletin of the Tokai Regional Fisheries Research Laboratory*, No. 24, June 1959, pp. 81-84, printed in Japanese with English summary. Tokai Regional Fisheries Research Laboratory, Tsukushima, Chuo-ku, Tokyo, Japan.

STICKWATER:

"Deodorization of Stickwater Distillate by Ion Exchange," by S. G. Wiechers and A. G. Pienaar, article, *Food Industries of South Africa*, vol. 12, no. 1, 1959, pp. 27-28, printed. Food Industries of South Africa, Odhams Press S. A. (Pty) Ltd., P. O. Box 4245, Cape Town, Union of South Africa.

TARIFFS AND TRADE:

Operation of the Trade Agreements Program, 12th Report, July 1958-June 1959, 298 pp., processed. Secretary, U. S. Tariff Commission, Washington 25, D. C., 1960. During the period covered by this report, the Contracting Parties to the General Agreement on Tariffs and Trade did not sponsor any multilateral tariff negotiations of the Geneva-Annecey-Torquay type. Shortly before the close of the period, however, they decided to hold a general tariff conference, beginning in September 1960, for the purpose of negotiating with the member states of the European Economic Community, with contracting parties that desire to renegotiate concessions in their existing schedules, with contracting parties that desire to negotiate new or additional concessions, and with countries that desire to accede to

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the General Agreement. The United States concluded limited trade-agreement negotiations with Brazil, Australia, Austria, Finland, the Netherlands, and New Zealand. Other developments reported include occurrences relating to the general provisions and administration of the General Agreement; the actions of the United States in connection with its trade agreements program; and the commercial policy developments in countries with which the United States has trade agreements.

TILAPIA:

"Preliminary Observations on the Chemical Composition of Fish Ponds and Their Resultant Crop of Tilapia Species," article, *IPEC Current Affairs Bulletin*, no. 28, August 1960, pp. 1-10, illus., printed. Indo-Pacific Fisheries Council, Food and Agriculture Organization of the United Nations, Bangkok, Thailand.

TRADE LISTS:

The Office of Economic Affairs, Bureau of Foreign Commerce, U. S. Department of Commerce, Washington 25, D. C., has published the following mimeographed trade list. Copies may be obtained by firms in the United States from that office or from Department of Commerce field offices at \$2 each.

Oils (Animal, Fish, and Vegetable)--Importers, Dealers, Producers, Refiners, and Exporters, Greece, 21 pp. (November 1960). Lists the names and addresses, size of firms, and types of products handled by each firm. Includes firms dealing in fish oil and cod-liver oil. Greece has to import fish oil and cod-liver oil since these oils are not produced locally.

TRAWLS:

"Increasing the Shearing Power and Stability of Trawl Doors by Means of a Profile with a Utilizable Moment of Force," by I. R. Mastrosov, article, *Rybnoe Khoziaistvo*, vol. 34, no. 9, 1958, pp. 40-49, illus., printed in Russian. Rybnoe Khoziaistvo, VNIRO Glavniproekta, pri Gosplanie S.S.S.R., Moscow, U.S.S.R.

"On the Relation Between Trawls and Fish," by F. I. Baranov, article, *Rybnoe Khoziaistvo*, vol. 34, no. 4, 1958, pp. 43-45, printed in Russian. Rybnoe Khoziaistvo, VNIRO Glavniproekta, pri Gosplanie S.S.S.R., Moscow, U.S.S.R.

"On the Towing Speed in Bottom Trawling," by V. F. Orshinnikov, article, *Rybnoe Khoziaistvo*, vol. 34, no. 1, 1958, pp. 48-51, illus., printed in Russian. Rybnoe Khoziaistvo, VNIRO Glavniproekta, pri Gosplanie S.S.S.R., Moscow, U.S.S.R.

TUNA:

"Biochemical Studies on Tuna. I--Extraction of Nucleic Acid and Determination of Base Compound," by Y. Fujii and S. Higasa, article, *Nankai-ku-Suisan Kenkyusho Hokoku*, vol. 9, 1958, pp. 136-142, printed in Japanese. Nankai-ku Suisan-Kenkyusho Hokoku, Nankai-ku-Suisan-Kenkyusho Sanbashi-dori, Kochi-shi, Japan.

"Pharmaceutical and Chemical Studies on Insulin. XX--Crystalline Proteins Isolated from the Crude Tuna Insulin," by K. Nagasawa and others, article, *Eisei Shikenjo Hokoku*, no. 75, 1957, pp. 95-98, printed in Japanese. Eisei Shikenjo Hokoku, Bulletin of the National Hygienic Laboratory, Tokyo, Japan.

"Le Prix de l'Albacore pour la Campagne 1960-1961" (The Price of Albacore during the 1960-1961 Season), article, *La Pêche Maritime*, vol. 39, no. 992, November 1960, p. 895, printed in French. La Pêche Maritime, 190, Boulevard Haussmann, Paris, France. French term "albacore" refers to yellowfin tuna.

TURKEY:

"İktisadi Planlama ve Balıkçılığımız" (Turkish Fisheries and Economics Plans), by Suleyman Arisoy, article, *Türkiye İktisat Gazetesi*, no. 388, August 26, 1960, pp. 5, 7, printed in Turkish. Odalar Birliği Matbaası, P. K. 397, Ankara, Turkey.

"Japon Heyetinin Hazırladığı Rapora Göre Türkiye Balıkçılığı" (Japanese Fisheries Mission Report on Turkish Fisheries), by Suleyman Arisoy, article, *Türkiye İktisat Gazetesi*, no. 401, November 24, 1960, pp. 1, 5, printed in Turkish. Odalar Birliği Matbaası, P. K. 397, Ankara, Turkey.

"Memleketimiz Balıkçılığında Sosyal ve Teknik Meseleler" (Social and Technical Problems of Turkish Fisheries), by Suleyman Arisoy, article, *Türkiye İktisat Gazetesi*, no. 362, January 12, 1960, p. 6, printed in Turkish. Odalar Birliği Matbaası, P. K. 397, Ankara, Turkey.

"Türkiye Balıkçılığı ve Eğitimi" (Turkish Fisheries and Education), by Suleyman Arisoy, article, *Türkiye İktisat Gazetesi*, no. 391, September 16, 1960, p. 5, printed in Turkish. Odalar Birliği Matbaası, P. K. 397, Ankara, Turkey.

"Türkiye'de Balıkçılık Mesleği ve Balıkçılık Terimi" (Fisheries Profession and Fisheries Terms in Turkey), by Suleyman Arisoy, article, *Deniz*, vol. 8, no. 61, April 1960, pp. 19-22, printed in Turkish. Deniz, B. Kervan, Matbaası, İstanbul, Turkey.

--Listings under Turkey supplied by Suleyman Arisoy, Fisheries Advisor, Agricultural Bank of the Turkish Republic, Ankara, Turkey

THE FOLLOWING ENGLISH TRANSLATIONS OF FOREIGN LANGUAGE ARTICLES ARE AVAILABLE ONLY FROM THE OFFICE INDICATED:

FROM THE FISHERIES RESEARCH BOARD OF CANADA, BIOLOGICAL STATION, NANAIMO, B.C., CANADA, THE FOLLOWING:

U.S.S.R.:

On the Causes of the Marked Decline in Kamchatka Salmon Populations, by I. I. Kurenkov, Translation Series No. 262, 2 pp., processed, 1960. (Translated from *Priroda*, no. 2, 1959, p. 123.)

Effect of Intensity of Fishing on the Stocks of Caspian Shad (Puzanok--ALOSA CASPIA CASPIA Svetovidov), by E. N. Kazanchev, Translation Series No. 273, 5 pp., processed, 1960. (Translated from *Rybnoe Khoziaistvo*, vol. 35, no. 4, 1959, pp. 16-18.)

The Effectiveness of the Work of Fish-Cultural Establishments in the Sakhalin Region, by I. K. Cherniavskaya, Translation Series No. 271, 3 pp. processed, 1960. (Translated from *Rybnoe Khoziaistvo*, vol. 35, no. 9, 1959, pp. 22-24.)

2. Instructions for Collecting and Examining Materials Obtained in Investigations of the Food of Plankton-Eating Fishes, by V. G. Bogorov, Translation Series No. 254, 15 pp., processed, 1960. (Translated

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from publication of Vsesoiuznoye Nauchno-Issledovatel'skoye Institut Morskovo Rybnovo Khoziaistva i Okeanografii, 15 pp., 1934.)

The Question of the Migratory Impulse in Connection with the Analysis of Intraspecific Biological Groups, by N. L. Gerbilsky, Translation Series No. 260, 10 pp., processed, 1960. (Translated from Akademiia Nauk SSSR, Ikhtologicheskaya Komissiya. Trudy Soveshchaniy, no. 8, 1958, pp. 142-152.)

Some Results of Mass Marking of "Non-Standard" Sturgeon Fingerlings by Means of Radioactive Phosphorus, by G. S. Karzinkin, E. V. Soldatova, and I. A. Shekhanova, Translation Series No. 279, 15 pp., illus., processed, 1960. (Translated from Migratsii Zhi-votnikh, no. 1, 1959, pp. 27-40.)

FROM THE FISHERIES RESEARCH BOARD OF CANADA, BIOLOGICAL STATION, ST. ANDREWS, N.B., CANADA, THE FOLLOWING:

The Effect of Some Aspects of the Biology of Euphausiacea upon the Summer Feeding Conditions for Cod in the Barents Sea, by S. S. Drobysheva, Translation Series No. 224, 18 pp., processed, 1959. (Translated from Trudy Poliarnovo N. -I. Institut Morskovo Rybnovo Khoziaistva i Okeanografii (PINRO), no. 10, 1957, pp. 108-124.)

Fish Farming--An Important Source for Increasing Food Resources, USSR, by S. Alekseyev, JPRS 3850, 8 pp., processed. (Translated from Sovetskaya Torgovlya, no. 8, August 1958, pp. 12-15.) U. S. Joint Publications Research Service, 205 E. 42nd St., Suite 300, New York 17, N. Y. (Photocopies of this report are for sale by Photoduplication Service, Library of Congress, Washington 25, D. C.)

WASHINGTON:

Washington State Department of Fisheries, 1959 Annual Report, 243 pp., illus., printed. Washington State Department of Fisheries, 4015 20th Ave., W., Seattle 99, Wash., 1960. This report includes information on the activities of the Department of Fisheries during 1959 in the fields of fish farming, marine farming and stream improvement, and fisheries law enforcement. Sections are also included on otter trawling, salmon trolling, the herring fishery, coastal inves-

tigations, Columbia River fisheries, sports fishery, and salmon escapement. Specialized problems are dealt with in chapters on the Japanese seed oyster export program, the coastal pink shrimp fishery, Olympia oyster reproduction, hatchery operations, and shellfish predator control. A considerable portion of the report is devoted to the 1959 fisheries statistical report containing data on commercial landings and fishway counts.

WATER POLLUTION:

Biological Problems in Water Pollution, compiled by C. M. Tarzwell, 296 pp., illus., printed. U. S. Public Health Service, Department of Health, Education, and Welfare, Washington 25, D. C., 1960. The transactions of a seminar held at The Taft Sanitary Engineering Center, Cincinnati, Ohio, in April 1959. General topics include effects of radioactive wastes, pesticides, and oil refinery wastes on aquatic life; marine and estuarine pollution; and application of biological findings in pollution abatement. Many leading pollution specialists in the United States attended the seminar, and their combined papers encompass the progress and research needs of today in the field of biological pollution studies.

WHALES:

Nutrient from the Brains of Whales, by H. Kondo and Z. Narita, Japanese Patent 4794, printed in Japanese. Tokkyocho (Patent Office), No. 1 Sannencho, Kojimachiku, Tokyo, Japan.

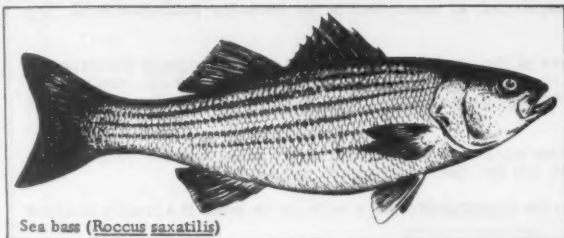
WHALING:

"International Whaling Commission", by R. G. R. Wall, article, Norsk Hvalfangst-Tidende (The Norwegian Whaling Gazette), vol. 49, no. 11, November 1960, pp. 505-517, printed in Norwegian and English. Norsk Hvalfangst-Tidende, Sandefjord, Norway. Report of the twelfth meeting of the International Whaling Commission, held in London, June 20-24, 1960. Covers the order of business and the individual reports of the scientific, technical, and other committees. Discusses in detail the condition of the stocks of various species, pursuance of the conservation aims of the International Whaling Convention, Antarctic catch limitation, the Netherlands and Norway and the Convention, the humane killing of whales, and other topics.



STRIPED BASS AIR-TRANSPORTED TO KENTUCKY LAKE

The Virginia Fisheries Laboratory, Gloucester Point, played host to scientists from the Kentucky Fish and Wildlife Department and Tennessee Commission of Game and Fishes aboard the Laboratory's research vessel *Pathfinder* the latter part of August 1960, using it as living quarters and a laboratory while young Chesapeake Bay



Sea bass (*Morone saxatilis*)

striped bass or rockfish were captured for transplanting in Kentucky Lake. Kentucky Lake is partly in the state of Kentucky and partly in Tennessee and is about 150 miles long.

Some striped bass have been introduced into the lake and there were some signs of egg laying in spring 1960, but

there is no evidence of successful growth of young. The Commissioners from Kentucky and Tennessee are anxious to increase the stock of striped bass for sport fishing in their area. "We anticipate that sport fishermen will pay between \$3 and \$4 million annually for fishing in Kentucky Lake, if it becomes well stocked, the Kentucky Fish and Wildlife Department stated. "We also hope that the rockfish will feed on gizzard shad and threadfin shad which are scrap fish in Kentucky Lake."

Striped bass impounded or introduced in Kerr Reservoir (Buggs Island) on the Virginia-Carolina border have reproduced themselves and are offering excellent fishing for sportsmen in that area. They have also been bred successfully in the Sante Cooper Reservoir in South Carolina.

A number of young striped bass, fingerling length, were collected and placed in plastic bags. The water in the bags was treated with a germicidal and the bags were inflated with oxygen. Under these conditions the fish can survive successfully for at least 72 hours.

In order to insure rapid transportation, an Army helicopter from Fort Eustis picked up the fish and transported them to Langley Field, where they were transferred to a Tennessee National Guard Plane and flown to Kentucky Lake. All of the fish were less than a year old, but an additional number of year-old fish were taken by truck to the lake.

This is not the first transplant of striped bass to new waters. In 1879 and again in 1881, striped bass from Navesink River, N. J., were shipped by train to San Francisco Bay. A total of 435 fish were successfully transported and within ten years over a million pounds of fish were being caught commercially. California has excellent sport fishing for striped bass, and the California Game and Fish Commission estimates that over \$10 million is spent by sportsmen for striped bass fishing alone.

The Virginia Fisheries Laboratory reported that there was an unusually good survival of young striped bass two years ago which was expected to supply excellent fishing the fall of 1960 in Virginia. The outlook for good striped bass fishing for sportsmen and commercial fishermen is good for the next few years.

HOW SCIENTISTS TRAWLED DOWN TO 30,000 FEET

The voyage of the Danish research vessel Galathea, in 1950-52, made a fine contribution to the study of the seven seas. Of particular interest to trawlermen, however, was the technique employed when she was trawling depths of three miles and more. Here is a summary of the methods used and some of the difficulties encountered, as described in the recently-published book, The Galathea Deep-Sea Expedition.

When trawling depths such as those of the great ocean trenches of the Southern hemisphere, the scientists of the Galathea had to deal with problems which are not encountered in commercial fishing. Perhaps the most important was the judging of the length of wire necessary to trawl the bottom.

It must be realized that, at the depths worked, the pressure on the trawl and the weight of the wire was such that it was impossible to tell by "feel" just where the net lay.

Resistance was much the same when the trawl floated half a mile up as when it actually dragged the bottom.

In order to judge the minimum length of wire needed at any given depth, the scientists used a system of theoretical analysis involving the law of resistance to a cylinder. A cylinder moving horizontally through water on a vertical axis encounters a ratio of resistance in direct proportion to its length. Moving horizontally while its axis is also horizontal, however, resistance is only slightly increased for every additional unit of length.

A trawl wire, which passes through water at an acute angle, encounters both transverse and longitudinal resistance. A free wire dragged behind a ship will always be straight; the greater the speed, the nearer horizontal it will be, but the greater its weight, the nearer it approaches the vertical.

A wire dragging a weight, however, forms a slight curve.

Taking these factors into account, and also the known resistance of the trawl, it was possible to calculate from the angle of the upper end of the wire, and from its diameter, speed, and the depth of the bottom, exactly how much wire must be paid out before the trawl grounded.

The diameter of the wire seems, at first sight, to have a surprisingly disproportionate effect on the calculations. For example, at a depth of 16,000 feet at two knots, 31,200 feet of 9 mm. wire is needed, while only 25,675 feet of 12 mm. wire reached bottom at the same depth and speed. The weight of the thicker wire keeps it that much nearer to the vertical.

The huge winch drum of the Galathea held 39,000 feet of trawl wire, and to obtain adequate strength it was made with an increasing diameter from the lower to the upper end. Starting with 3,000 feet of 9.3 mm. wire, it ended with 2,470 feet of 21.8 mm. diameter. The breaking strain of the last length was nearly five times that of the first, but it had, of course, to carry the whole weight of the 39,000 feet besides the weight of the trawl and its contents.

Once the trawl was over the side and the calculated length of wire paid out, it was assumed that it reached bottom when the wire formed a correct angle with the surface of the water.

If the angle was too small, speed was reduced very carefully, because of the danger of the trawl dragging beneath the ship. If the angle was too large, speed was increased. The angle was checked on a special gauge.

Tension was checked, too, by means of a dynamometer, as at the depths being worked an obstruction might not otherwise be noticed before the wire parted.

Tension, however, varies with all sorts of factors on long lengths of line, so the scientists often found it difficult to decide whether to continue trawling. They were fortunate, as it turned out, in that they did not once break the wire. Their system proved successful in every one of the deep-sea trawls they made. (The Fishing News, September 6, 1957.)

The BENEFITS of FISH

